PROCEEDINGS
57th Annual
SOUTHERN FOREST INSECT WORK CONFERENCE

The Chancellor Hotel
Fayetteville, Arkansas
21–24 July 2015

Robert Coulson and John Riggins, Program Chairs
Fred Stephen, Local Arrangements

Officers: 2014–2015
Chairman……………………………………………………………………………….. Kier Klepzig (2014–2017)
Secretary-Treasurer…………………………………………………………………….. Will Shepherd
......................................................................................................................... Lynne Rieske-Kinney (2014–2018)
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18 students, 2 retirees, and 64 professional members = 84 registered participants
SFIWC 2015 Group Pictures

Figure 1
**Front Row (left to right):** Robert Trickel, Fred Stephen, Jim Guldin, Yanzhuo Zhang, Ariel Heminger, Molly Darr, Lynne Thompson

**Back Row (left to right):** Kenton Sumpter, Matthew Savage, Fred Hain, Lynne Rieske-Kinney, Jiri Hulcr, Scott Salom
Figure 2
Front Row (left to right): Iral Ragenovich, David Coyle, Shane Harrington, John Formby, Chandler Barton, Lori Chamberlin, John Nowak
Back Row (left to right): Frank Sapio, Kier Klepzig, Jim Hanula, Chip Bates, Will Shepherd, Bill Hargrove, Allen Smith
Figure 3
Front Row (left to right): Brian Sullivan, Mohammad Bataineh, David Kulhavy, Robert Jetton, Chris Asaro, Bob Rabaglia, Jim Ellenwood
Back Row (left to right): Tony Courter, Elizabeth Benton, Ben Smith, Don Grosman, John Riggins
Figure 4
**Front Row (left to right):** Kamal Gandhi, Robert Coulson, Ron Billings, Dana Stone, Holly Wantuch, Jake Bodart
**Back Row (left to right):** Larry Galligan, Matt Ethington, Jess Hartshorn, Jerome Grant, Kimberly Wallin
Figure 5
(left to right): You Li, Thomas Whitney, Bud Mayfield

Attendees not pictured: Carissa Aoki, Matt Ayres, Paul Chaloux, Randy Chapin, JC Chong, Steve Clarke, Natalie Clay, Brent Cutrer, Don Duerr, Robert Farris, Chris Foelker, Christopher Garza, Anna Greis, Laurel Haavik, Ann Hajek, Brian Hall, Sam Kim, Marc Linit, Al Lyons, Alice Mandt, Jim Meeker, Tom Payne, Ryan Rastok, Mike Silliman, Sedonia Steininger, Caroline Storer, John Thomason, Jody Thompson, JT Vogt, David Wakarchuk, Alan Wilson
[**Abstract:** High-density stands of mature or maturing loblolly pine (*Pinus taeda*) are highly susceptible to losses from the southern pine beetle (SPB, *Dendroctonus frontalis*). Thinning is the primary tool for preventing and mitigating SPB damage; however, questions remain about the impact of variable thinning operations on treatment efficacy. Field studies are expensive and inflexible for evaluating various types of thinning treatments over large areas and long time periods. To address these shortcomings, and provide guidance on silvicultural treatment selection for field studies, a process model was developed (SPBLOBTHIN) to simulate the within-stand joint population dynamics of loblolly pine and SPB. The model grows and tracks individual trees and beetles, both temporally and spatially, includes stochasticity where desired, and allows users to assign values to input parameters, including those that designate temperature, site index, tree resistance, stand density, and type/method of thinning (as well as triggers and residual targets). Model output values have been linked to SVS, the US Forest Service's stand visualization system, producing accurate and informative views of stand and tree characteristics over time. Thus, SPBLOBTHIN provides a wide range of flexibility and utility, as demonstrated by examples of model outputs displayed through SVS stand images. To evaluate model performance, simulations were created to mimic the original field study from which current pest management thinning recommendations for loblolly pine are primarily based. A comparison of field vs model results indicated that beetle immigration was required at an increasingly higher rate over the two higher levels of stand basal area tested (i.e., 130 and 200 sq ft/ac), in order to mirror tree mortality levels observed in the field. Additional evidence also supports this immigration pattern, leading us to conclude that although unmeasured, SPB immigration into field plots was necessary for the observed pattern of tree mortality to be realized. Under these conditions, SPBLOBTHIN performed well and provided insights that were not obvious from the original field results, supporting its use in complementing field experiments.]

Steve Clarke¹, John Riggins², and Fred Stephen³. USDA-FS-FHP¹, Mississippi State University², and University of Arkansas³. SPB through the (man)ages.

[**Abstract:** The frequency and intensity of SPB outbreaks throughout the last century and a half was driven by climatic conditions, biotic factors such as population numbers of natural enemies and competitors, and the prevailing forest management strategies of the era, yet the latter has received little attention except in the development of hazard rating systems. The lack of sustainable forest management between the Civil War and WWI allowed extensive yet infrequent SPB outbreaks to develop. The cut-out and get-out felling of virgin forests across the South coupled with the tree loss from earlier outbreaks contributed to the rarity of SPB activity between WWI and WWII. The advent of intensive forest management and the regeneration of
pine forests during this period set the stage for the frequent and often cyclic pattern of SPB outbreaks after WWI. The implementation of SPB suppression programs beginning around 1960 reduced SPB impacts but also ensured that suitable host habitat was continually available. In recent years, the conversion of loblolly pine stands to longleaf pine, the initiation of the SPB Prevention Program, increased forest fragmentation, and swift suppression of infestations, as well as climatic and other factors, have resulted in localized and short-lived outbreaks in the South.

Tony Courter, Steve Clarke, Jim Meeker, and Frank Sapio. USDA-FS-FHP. The southern pine beetle information system, a new interface.

John Nowak and others. USDA-FS-FHP. State of the beetle – discussion of SPB activity in the U.S.

[Abstract: (Chris Asaro) Since the large southern pine beetle outbreak of the 1990s (1992-94) which spanned about two thirds of the state, Virginia has not seen another outbreak in southern pines that impacted more than a small fraction of a county. Several notable examples of SPB activity in Virginia were given: The Kerr Reservoir and Pocahontas State Park outbreaks of 2007, the Hanover County outbreak of 2011, and the Virginia Beach and Chincoteague/Assateague island outbreaks of 2013-2015. All of these outbreaks can be explained by stands that were some combination of old, overstocked or on challenging sites for loblolly pine. However, none of them expanded beyond a limited area and no outbreak counties have been recorded in over a decade.

(Jim Meeker) The National Forests in Mississippi are facing troublesome SPB activity for the fourth consecutive year. Although the spring pheromone trapping survey failed to forecast a problem, ground work on the Bienville NF this spring revealed multiple infestations of concern. A detection flight in mid-June identified 50 spots throughout the District and on adjoining private lands. Follow up evaluations revealed tens of infestations >1/4 ac in size and actively enlarging. Aggressive suppression measures (i.e., Cut & Leave) were implemented in an attempt to prevent the outbreak from worsening. A second detection flight in late July revealed over 167 additional spots, 133 of which were actively enlarging and requiring control. Forest Service saw crews have treated more than 42 spots and contracted sawyers have treated an additional 54 spots as of Sept. 1, the largest being approx. 14 acres in size. Mechanized Cut & Leave utilizing logging equipment has been prohibited due to issues concerning potential damage to cultural and archeological resources, and Section 106 requirements of the National Historical Preservation Act of 1966. Cut & Remove has also been stymied due to the lengthy process and resources necessary to implement a timber sale on FS lands. Over 230 multi-tree infestations (affecting over 200 acres) have been identified on the Bienville this year, which contains approximately 145,000 acres of susceptible host type (i.e., 1.6 spots/1000 ac of host type). The Homochitto also identified over 40 spots in late July, about ½ of which required control.

(Bob Rabaglia) The southern pine beetle was found infesting pitch pine (Pinus rigida) on Long Island, New York in late 2014. This is the first documented occurrence of SPB in New York. Ground and aerial surveys found heavy infestations in the Pine Barrens of eastern Long Island in Suffolk County. Several suppression projects (cut and leave) were started in later winter on State, National Park Service, and Fish & Wildlife Service lands. The Durham Field Office (DFO), Northeastern Area is providing technical assistance to State and Federal agencies, and funding was provided for the suppression projects.

In early 2015, SPB was also found infesting pines in south-central Connecticut. This was the first report of SPB in the State.

In spring, 2015 trapping was conducted for SPB in several of the DFO states using either frontalin and the Sirex lure or frontalin, endo-brevicomin and Sirex lure. SPB was found again in Connecticut, and for the first time in Massachusetts, Rhode Island and the Hudson Valley in New York. Surveys are continuing in these areas.]

3:00 - 7:00 PM Meeting Registration (Organizer: Will Shepherd, USDA-FS-SRS) - Chancellor Hotel - 2nd Floor
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<td>4:30 - 5:00 PM</td>
<td>Executive Team Meeting (Organizer: Kier Klepzig, USDA-FS-SRS)</td>
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<td>5:00 - 6:00 PM</td>
<td>Discussion Panel: Emerald Ash Borer in the South (Organizers: Chandler Barton, Arkansas Forestry Commission, and Sam Kim, Arkansas Plant Board)</td>
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<td>5:00 - 5:30 PM</td>
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<td>5:30 - 6:00 PM</td>
<td>Roger F. Anderson Award Meeting (Organizer: Fred Stephen, University of Arkansas)</td>
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<td>6:00 - 8:00 PM</td>
<td>Poster Set-up (Organizer: John Formby, Mississippi State University)</td>
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<td>6:00 - 8:00 PM</td>
<td>Mixer and Reception @ The Garden Room, 215 West Dickson St. Fayetteville, AR 72701</td>
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**Wednesday, July 22nd**

Breakfast on your own

6:00 – **Sunrise Runners Tour** (Organizer: Jessica Hartshorn, University of Arkansas) Location TBD

8:00 – onwards **Meeting Registration** (Organizer: Will Shepherd, USDA-FS-SRS) - Chancellor Hotel - 2nd Floor

8:00 - 8:15 AM **Welcome Address to Southern Forest Insect Work Conference** - Eureka Springs A&B

Bob Coulson, Texas A&M

8:15 - 8:45 AM **Opening Business Meeting** - Eureka Springs A&B

Kier Klepzig, USDA-FS-SRS

8:45 - 9:25 AM **Keynote Presentation** – (Organizer: Fred Stephen, University of Arkansas) - Eureka Springs A&B

James Guldin, Supervisory Research Ecologist and Project Leader, USDA-FS-SRS. The changing face of southern silviculture in the 21st century, with implications for forest health.


Al Lyons, Vice President of Health, Safety, and Environment, Hancock Forest Management. Perspectives from a Timber Investment Management Organization (TIMO).

Alan Wilson, Atlantic Region R&D Coordinator, Rayonier. Perspectives from a Real Estate Investment Trust (REIT).

10:25 - 10:55 AM **Break & Group Photos** (Organizer: Ron Billings, Texas A&M Forest Service)

10:55 - 12:10 PM **Plenary Session II – Challenges and Opportunities for the Future of Insect, Disease and Invasive Plants R&D in the Forest Service.** (Organizer: Bob Coulson, Texas A&M) - Eureka Springs A&B


**Abstract:** U.S. forests will be impacted by a variety of factors in the future. Changing climate, economic influences, land use, biotic threats, fire and scarce resources to deal with the above will
all impact forest health and resilience. The Southern Forest Futures Project identified four primary factors interacting to reshape the forests of the southern U.S., in particular: Population growth, climate change, timber markets, and invasive species. Approaches to predict and manage such changes may include new efforts in remote sensing (ForWarn), suppression programs, and altered research programs. A new paradigm of considering the ecosystem function impacts of invasives (sensu Tally) may also be called for. Anticipating the future, there will be an even greater need for monitoring to address anticipated changes, research that targets anticipated future needs, and forest management and restoration strategies that anticipate this changing world. New approaches will be needed which could involve leveraged positions with FHP, Universities and States, external funding, constant adjustment of priorities, and a greater focus on federal issues. There are also opportunities now to look at use of the “Work” conference to be strategic, consider different models of cooperation (What do we ALL need to be working on?) and work towards mutual support in challenging times.

Chris Asaro. USDA-FS-FHP. A Regional Perspective: The Role of the Forest Health Monitoring (FHM) Program.

**Abstract:** The Forest Health Monitoring (FHM) Program is part of the USDA Forest Service, State and Private Forestry, Forest Health Protection (FHP) and has been in existence in its current form since the mid-1990s. There are 5 FHM Regions across the United States. As part of FHP, the FHM program provides technical assistance to the state forestry agencies, including support and training to conduct aerial and ground surveys, and apply remote sensing tools to detect forest disturbances. Forest health data collected by state agencies is gathered, analyzed, and summarized in multiple reports and web applications, in concert with data collected by the National Forests and the Forest Inventory and Analysis (FIA) Program. The FHM Program is divided into 5 subject areas, including Detection Monitoring, Evaluation Monitoring, Intensive Site Monitoring, Research on Monitoring Techniques, and Analysis and Reporting. Detection monitoring is the core activity of the state forestry agencies. A major goal of the FHM program is to standardize data collection methods by state forest health programs with varying degrees of personnel, skill and experience. Evaluation monitoring provides competitive grant funds to support more in depth analysis of trends or phenomena observed via detection monitoring or through FIA data analysis. Evaluation monitoring enables applied research by academia, states, or federal agencies, who often work closely together on such projects to better understand new or emerging trends in forest health. Intensive Site Monitoring looks at ecosystem processes in more depth, but has rarely been applied due to lack of funding. Research on Monitoring Techniques looks to improve on methodologies for detecting disturbances and forest health trends. The hallmark of a strong FHM program is communication, data sharing, and standardization.

Bud Mayfield. USDA-FS-SRS. A Project Perspective: Identifying and Addressing Key Problems in the Southern U.S.

12:10 - 1:30 PM  
**Lunch On Your Own**

1:30 - 3:00 PM  
**Graduate Student Session (Organizer: Robert Jetton, North Carolina State University) - Eureka Springs A&B**

**Molly Darr, Virginia Tech and Matthew Ethington, University of Arkansas, Moderators**

Sedonia Steininger¹, Jiri Hulcr¹, Richard Stouthamer², and Robert Rabaglia³. University of Florida¹, University of California-Riverside², USDA Forest Service³. Combining molecular phylogenies with careful morphological assessment to distinguish species in the *Euwallacea fornicatus* complex.
Abstract: A tiny ambrosia beetle species often identified as *Euwallacea fornicatus* is invading California and Florida and spreading disease to avocados. It has become apparent that this is a complex of cryptic species, some of which are destructive and some harmless. Using a combination of molecular phylogenetic analysis and careful morphological analysis, we have discovered a suite of characters to help insect identifiers on the front lines of invasion prevention diagnose this cryptic species.

Caroline Storer and Jiri Hulcr. University of Florida. Tracking the global spread of a common and pest ambrosia beetle using genome sequencing.

Abstract: Each year new exotic species are transported across the world through global commerce. Many of these exotics never become successfully established. However, a few become destructive pests threatening economic and environmental resources. Some of the most successful exotic species are the ambrosia beetles. The ability to mate with siblings (inbreed) and their transportable food source (symbiotic fungus) enabled them to colonize most of the world. Increasingly, these exotic ambrosia beetles are becoming pests of plant nurseries, stored lumber, and forests. The purpose of my research is to uncover the population expansion history of one of the most widespread and abundant pest ambrosia beetles: *Xylosandrus crassiusculus*. Specifically, I am determining the source of introductions, assessing if the apparent ubiquity of this beetle is actually cryptic species diversity, and testing different expansion scenarios. Using restriction site associated DNA (RAD) sequencing, which combines high-throughput genomic marker discovery and genotyping, I have genotyped 196 beetles from locations across the species native and introduced range at hundreds of genomic loci. Analysis of the genotype data indicates that there are two distinct lineages of this “super-tramp” species. One lineage originated in China and has spread through Southeast Asia and Africa. The other lineage originated in Japan and has spread to the continental U.S. and Central America. Patterns of genetic differentiation suggest that there has been more than one introduction event from Japan in the continental U.S. while both Japanese and Chinese lineages have been introduced to Hawaii. Currently, I am using Bayesian information criterion (BIC) for testing different models of expansion to better infer the mechanisms facilitating the spread of this species in the U.S.

Christopher J. Foelker, Christopher M. Whipps, Dylan Parry, and Melissa K. Fierke. State University of New York. Parasitism of *Sirex noctilio* by native parasitoids in long-established vs. newly-invaded sites.

Abstract: *Sirex noctilio* F. (Hymenoptera: Siricidae) is an invasive forest pest across the Southern Hemisphere and has been established in the northeast for over a decade. Thus far, its damage has been minimal and mortality has been restricted to stressed and weakened Scots (*Pinus sylvestris* L.) and red pine (*P. resinosa* Aiton). Its limited impact may be due to biotic interactions with native bark beetles, congeners, and hymenopteran parasitoids. However, establishing and quantifying trophic linkages is complicated by its subcortical larval development and complex life cycle. We used DNA barcoding techniques to investigate trophic linkages among *S. noctilio*, a native pine siricid (*Sirex nigricornis* L.), and a suite of shared native hymenopteran parasitoids. We felled recently-infested trees (*n* = 44) from regions across New York and Pennsylvania that varied in time since *S. noctilio* invasion, with long-established, intermediate, and newly-invaded sites. Larvae of siricids, parasitoids, and associated cadavers were collected *in situ* by dissecting infested material with a log splitter. An interesting finding in this study was 15.2% of developing siricid larvae had an ibalid parasitoid feeding internally, a point not reported in previous quantifications of parasitism in North America. We had the greatest success in identifying siricid host from the gut content of ibalid and rhyssine parasitoids in the larval life stage (78.1% and 90.2%, respectively). Hymenopteran parasitism was significantly different across the three regions, with parasitism being less at newly-infested sites than long-established and intermediate sites. Parasitism of *S. noctilio* was 20.6% at the long-established, 19.4% at the intermediate, and 14.0% at newly-infested sites. *Sirex nigricornis* was
only recovered at newly-infested sites. Lower parasitism by *S. noctilio* at newly-infested regions may be due to a lag time in response by natural enemies to a new super-abundant host.


**Abstract:** The pine bark adelgid, *Pineus strobi* (Hemiptera: Adelgidae), is a native herbivore of eastern white pine, *Pinus strobus*, in eastern North America. Like other adelgid species, the pine bark adelgid is a phloem feeding insect with limited mobility. Spending the majority of its lifetime anchored to a single location on a tree, it can be found either on the bark, stem, or needle base. The only known predator to specialize on pine bark adelgid is *Laricobius rubidus* (Coleoptera: Derodontidae), about which relatively little is known. *L. rubidus* is closely related to *Laricobius nigrinus*, a biological control agent introduced for hemlock woolly adelgid, and it was found that the two species successfully hybridize and produce fertile offspring. It is unknown whether interaction with an introduced sibling species and its respective adelgid prey species will have any implications for *L. rubidus* or the pine bark adelgid by extension. Thus, it is important to characterize the phonological patterns of these insects, specifically in their southern ranges, where they have not been studied previously.


**Abstract:** Hemlock woolly adelgid, *Adelges tsugae* (HWA), is an exotic pest of eastern hemlock from Japan that has spread throughout the east coast. HWA is known to cause hemlock decline and death. My study is assessing the impact of *Laricobius nigrinus* (Coleoptera: Derodontidae), a predator of HWA from the Pacific Northwest, on HWA in the mid-Atlantic region. We identified three sites, one in Maryland, two in Virginia, that had releases of Ln at least four years prior to the beginning of the study in Fall 2014, high density of HWA present, and recoveries of Ln. At these sites one of three treatments were given to specific hemlock branches: closed bag (exclude Ln), open bag (allows for Ln to enter bag and to assess for cage bag effects), and no bag (an open branch). This allowed us to assess the impact that Ln was having on the HWA population at each of the sites. The upper half of the test branches were removed during the peak of ovipositioning for HWA to assess Ln egg numbers and HWA mortality, the last half of the branch was removed during the peak of Ln larval feeding. We successfully recovered Ln from Kentland Farm located in Virginia. The second part of the study we visited Ln release sites in Virginia, we sampled for Ln through beat-sheeting and branch clippings. Currently, 13 of the 20 release sites have been sampled in Virginia and Laricobius larvae have been recovered from two of the thirteen sites. This research aims to help us better understand if Ln is establishing at release sites and the degree of an impact they have on the HWA population.

Kenton Sumpter1, Scott Salom1, Carlyle Brewster1, Albert "Bud" Mayfield III2, Troy Anderson1, and Tom McAvoy1. Virginia Tech1, USDA Forest Service SRS2. Evaluating a potential area-wide IPM strategy for managing Hemlock Woolly Adelgid in the Eastern United States.

**Abstract:** Use of the neonicitinoid insecticide, imidaclorpid, has been found to be highly effective in suppressing hemlock woolly adelgid (HWA) (Eisenback et al. 2010, Eisenback et al. 2014, Mayfield et al 2014). Similarly, *Laricobius nigrinus* Fender (Ln) (Coleoptera: Derodontidae) has been found to be a likely candidate for biological control (Zilahi-Balogh et al. 2002). Each control tactic has different objectives and outcomes. In an attempt to utilize the best of both
approaches, a project was designed to develop a pest management strategy that utilizes both tactics concurrently within the same sites. The goal of this project is to assess the efficacy of a combined chemical – biological control strategy designed to reduce HWA populations and improve the health of hemlock forests. The project is being conducted across three states; Kentucky, West Virginia and Tennessee, and began in 2010 with data having been collected annually since then. Continued data collection will be carried out at all three sites through spring 2016. Thus far, tree health has declined across all sites regardless of treatment type, and HWA population indices have been shown to be highly variable. Ln was initially recovered from its release plots (KY = 2010-2013, WV = 2011-2013) however, there have been no successful recoveries in 2014 and 2015 at any site.

Elizabeth P. Benton¹, Jerome F. Grant¹, Tom C. Mueller¹, R.J. Webster², and R.J. Nichols². University of Tennessee¹, Great Smoky Mountains National Park².

Is imidacloprid from hemlock woolly adelgid treatments a concern for surface water quality?

[Abstract: Imidacloprid, a neonicotinoid pesticide, is commonly used for the suppression of hemlock woolly adelgid, Adelges tsugae (Annand) (HWA) (Hemiptera: Adelgidae) on hemlocks in the eastern U.S. Great Smoky Mountains National Park (GRSM) has an extensive HWA integrated pest management (IPM) program to preserve GRSM’s hemlock resources. To date, more than 200,000 individual hemlocks in the park have received imidacloprid soil treatments. A retrospective study was conducted in cooperation with GRSM to assess whether imidacloprid and two of its insecticidal metabolites (5-hydroxy and olefin) are present in surface waters (i.e., streams) associated with HWA imidacloprid treatment areas.

Water samples were collected from 30 stream locations in GRSM to test for the presence and concentration of imidacloprid, 5-hydroxy, and olefin. Ten streams were sampled downstream from riparian areas where hemlocks received imidacloprid soil treatments. Water samples also were collected in each of the selected 10 streams immediately upstream from each hemlock treatment area. In addition, a control stream in close proximity to each treatment stream was sampled. The concentration of imidacloprid, 5-hydroxy, and olefin in parts per trillion (ppt) was determined by liquid chromatography mass spectroscopy (LC/MS). Historical treatment data from GRSM was integrated into data analysis. Data were analyzed using a Kruskal-Wallis test (P < 0.05), least significant difference (LSD), and a multiple regression (P < 0.05).

Imidacloprid was detected in 7 of the 10 downstream sampling locations in concentrations ranging from 28.5 to 379 ppt. Imidacloprid was not detected in upstream or adjacent stream locations. Five-hydroxy and olefin were not detected in any streams. There was a positive relationship between the total amount of imidacloprid applied to a hemlock treatment area and the concentration of detectable imidacloprid in the associated stream. While imidacloprid is present in streams associated with hemlock treatment areas, the concentrations are below USEPA chronic and acute aquatic life benchmarks for fish (1,200 and 41,500 ppb, respectively) and aquatic macroinvertebrates (1.05 and 34.5 ppb, respectively). However, since the amount of imidacloprid applied in a watershed has an influence on the concentration of imidacloprid in streams, the frequency and extent of imidacloprid applications must be carefully considered in HWA IPM programs.]

Matthew Ethington¹, Larry D. Galligan¹, David Wakarchuk², and Fred M. Stephen¹. University of Arkansas¹, Synergy Semiochemicals². Interactions of southeastern Monochamus with healthy shortleaf pines and a bark beetle associate, Ips grandicollis.
**Abstract:** *Monochamus titillator* and *M. carolinensis* are large wood-boring beetles commonly found in southeastern pine forests. These beetles interact with both their host pine trees and commonly associated bark beetles in ways that are still poorly understood. Our objectives are to determine if (1) healthy shortleaf pines can be successfully colonized by *Monochamus* beetles, (2) determine if *M. titillator* colonization of shortleaf pine affects survival of colonizing *Ips grandicollis*, and (3) determine if the time between *I. grandicollis* colonization and subsequent *M. titillator* colonization affects *I. grandicollis* survival.

In Arkansas shortleaf pine is one of the two most common pine trees found in mixed pine-hardwood stands. Shortleaf pine has both large volume and geographic distribution making factors influencing its health both economically and ecologically important. While most literature refers to *Monochamus* as saprophagous, recent studies in jack pine stands have shown that *Monochamus* can be primary tree killers.

A total of 48 healthy shortleaf pines were treated with lures, previously shown as attractive to *Monochamus*, and oviposition pits were counted. Of the 48 treated trees, 18 trees with a range of number of pits were destructively sampled. Pits were dissected to determine egg deposition and larval survival. Results demonstrate that healthy shortleaf pines can successfully defend themselves against *Monochamus* colonization, most likely through resinosis.

In Arkansas the most common bark beetle associate of *Monochamus*, found in trapping and emergence studies, is *Ips grandicollis*. Both *Monochamus* and *I. grandicollis* inhabit the same subcortical area and feed on the same hosts, making intraguild competition and/or predation very likely.

To determine the effect of *M. titillator* colonization on *I. grandicollis* survival a controlled laboratory study was done using shortleaf pine bolts infested with 30 *I. grandicollis*. These bolts were then exposed to either two or five mated female *M. titillator*. *M. titillator* introduction occurred on the same day, three days after, or six days after *I. grandicollis* introduction. Results demonstrate that *M. titillator* colonization leads to sub-cortical interaction which diminishes *I. grandicollis* survival.

Carissa Aoki¹, Lynn Fleming², and Matthew Ayres¹. Dartmouth College¹, New Jersey Forest Service². Forest structure and southern pine beetle risk in the New Jersey Pinelands.

**Abstract:** Although the range of southern pine beetle (*Dendroctonus frontalis* Zimmermann; SPB) has traditionally included southern New Jersey, outbreaks in that state were rare through the 20th century. In the early 2000s, an outbreak began in the southern part of the state and has since moved inexorably northward through the state’s pine forests, and SPB has now been detected to the north in Long Island, New York as well as in Connecticut. With this northward movement, SPB transitions from its usual hosts—loblolly and shortleaf pine (*Pinus rigida*)—to pitch pine (*P. rigida*). Although pitch pine has been noted as a host species, no previous research has documented how variation in pitch pine forest stand structure characteristics might affect risk of SPB infestation. The New Jersey Pinelands comprise a 1.1 million acre tract of federally protected land, consisting primarily of pitch pine and mixed pitch pine/oak hardwood forests. We combined field data collection in both infested and uninfested stands with GIS data on forest type and infestation locations beyond our field data collection sites. We found that while many stand and type characteristics that have conventionally been regarded as risk factors in the southern states, such as stand basal area, were also risk factors in New Jersey, the as yet mostly uninfested stands in the northern Pinelands maybe be at even higher risk of SPB infestation due to their unique forest structure.


**Abstract:** The emerald ash borer (EAB, *Agrilus planipennis* Fairmaire) (Coleoptera: Buprestidae) is a wood boring beetle which is causing extensive ash (*Fraxinus spp.*) mortality in eastern North American forests, drastically altering forest structure and composition. As EAB-
induced ash mortality progresses, the native arthropod associates of ash forests may be irreversibly altered through loss of habitat, changing abiotic conditions, and perhaps altered trophic interactions. I am documenting coleopteran communities associated with ash decline in EAB-impacted forests to evaluate the nature of these changes on five sites in central Kentucky with varying levels of EAB-induced ash mortality. Two sites are heavily infested with EAB and have high ash mortality. One site is moderately infested with slight mortality, and two sites have only recently been invaded with insignificant ash dieback. Arthropods were collected in a higher strata using Lindgren funnel traps with 70% ethanol lures and a lower strata using bottle traps with ethanol-emitting hand sanitizer lures to evaluate coleopteran activity in nine 0.04 ha plots within each of the five sites. Traps were deployed over a 16 week period from mid-May to mid-September. At each monitoring interval trap contents were removed, stored in 70% ethanol, returned to the lab for identification, and lures were replenished. In total ~19,000 Coleoptera have been collected and ~60 coleopteran families have been identified. Seasonal trends in beetle activity are evident, regardless of ash decline. Repeated measures analysis of variance was used to determine effects of EAB-induced ash mortality on total arthropod catch, as well as coleopteran abundance and family-level richness for the higher strata and lower strata. Data will be further analyzed by regressing arthropod population parameters (abundance, richness, diversity) against ash decline. In addition to documenting changes in arthropod community associates in ash forests due to invasion by EAB, my work is important because it could provide relevant information on native coleopterans, including their possible role as a source for EAB population-regulating natural enemies.

Thomas D. Whitney¹, Ashley N. Schulz¹, Chris Asaro², David R. Coyle¹, Michelle M. Cram³, Angela Mech³, Rima D. Lucardi⁴, and Kamal J.K. Gandhi¹. University of Georgia¹, Virginia Department of Forestry², USDA Forest Service³, USDA Forest Service SRS⁴. Link between a scale insect and eastern white pine dieback: overview and future directions.

[Abstract: Since 2006, patterns of dieback and mortality of eastern white pine (Pinus strobus L.) have been observed across its range, including the southern Appalachians. Symptoms have commonly included canker development, branch flagging, crown thinning, resinosis, and tree mortality. Given the economic and ecological importance of white pine, substantial research efforts have been initiated to determine the main factors affecting tree health. Our work conducted thus far indicates that a pine bast scale insect (Matsucoccus macrocicatrices Richards), along with multiple fungal pathogens, is primarily associated with canker formations and hence, tree dieback. Investigation of sites from the Northeast and Southeast revealed that 88% of symptomatic trees were infested with the pine scale. Further, the proportion of dead to living branches, as well as fungal canker surface area was positively correlated with scale insect prevalence. Previously considered a benign sap-sucking herbivore of white pine, native only to southeastern Canada and New England, these results suggest the wide presence of this insect is highly associated with tree dieback. Published information about this insect, however, is extremely scant. Hence, to better understand the biology and ecology of this tree-herbivore relationship, we plan to gather basic evolutionary data using various molecular techniques. Assessing the population structure and phylogeography of both the scale insect and its host tree will elucidate 1) whether there is a high level of genetic differentiation among natural white pine stands and 2) whether the pine bast scale was recently introduced to the Southeast or has long been present, but undetected, until now. Our multiple large-scale projects on white pine and the insect-fungal complex will help elucidate the extent, severity, ecology, and eventually management of the white pine dieback phenomenon in the eastern U.S.]

6:00 - 8:00 PM Poster Session and Reception (Organizers: John Formby, Mississippi State University) - Reception Area 2nd Floor
Thursday, July 23rd

Breakfast on your own

6:00 – Sunrise Yoga (Organizer: Jessica Hartshorn, University of Arkansas) – Location TBD

8:00 - 8:45 AM  A.D. Hopkins Address (Organizer: Kier Klepzig, USDA-FS-SRS) - Eureka Springs C&D


8:45 - 10:15 AM  Concurrent Session I

A. Conservation of an Endangered Species: Keeping Women in Forest Entomology (Organizer: Jessica Hartshorn, University of Arkansas) - Eureka Springs A

Molly Darr. Virginia Polytechnic Institute and State University. The roles of gender and sexual identity in the university setting.

Laurel J. Haavik. The Ohio State University. Forest entomology offers strength through community.


Iral Ragenovich. USDA-FS-FHP. The early years: then and now.

[Abstract: I was hired as the first female entomologist in Forest Health Protection (then Forest Pest Management) in 1975. That was three years after the passage of the Equal Rights Amendment (ERA), when there was a newly created emphasis on diversity. 38 states were required for ratification of the ERA and it was ratified by only 35, so it never became part of the Constitution. Of the 15 states that did not ratify the ERA, 12 were southern states. Prior to that time there was not equal pay for the same job, and men were often selected over women. A woman could not obtain a credit card unless the application was co-signed by a husband or father. I was turned down by two major credit card companies because I did not meet their “family” standards. Fortunately the federal government took the ERA seriously and placed and emphasis on hiring women.

And fortunately, I had many good mentors – Drs. Coster, Coulson, Stephens, and Payne. Even though there was emphasis on hiring a woman, that provided the opportunity to show that women could do the job. Internal attitudes and perceptions included: do not to apply for the job if you are planning to get married; the men felt like they were going to have to do the woman’s share of the work, as well as their own; and concerns about having to travel with (or tell their wives they were traveling with) a woman. Early female entomologists would have to dispel both internal and external misconceptions.

Sexual harassment in the early years existed, especially when there were only one or two women represented. This did not occur among colleagues and mentors, but more often among others associated with, but not necessarily part of, the forest entomology community. Gratitude is expressed to those colleagues who helped in those situations.

Unique, possibly to the South, was the external, or public, response to a white woman working and traveling with a black man.]
Over time, women working in a traditionally male field have helped influence perceptions and attitudes for which both men and women have benefitted. For example:

1) Both women and men are allowed maternity/paternity leave to accommodate new family arrivals; and,
2) There is flexibility in allowing parents to bring children into work if necessary.
3) Career ladders that were previously open only to those with traditional forestry backgrounds – District Ranger, Forest Supervisor, etc. - are now open to employees with non-forestry backgrounds – a computer scientist can be a District Ranger, and a human resource specialist can become a Regional Forester.]

B. Current and Potential Exotic Species and Their Impacts in the SE US, Part I.
(Organizer: David Coyle, University of Georgia) - Bella Vista

John Formby¹, Natraj Krishnan¹, Kelly Oten², and John Riggins¹. Mississippi State University¹ and North Carolina Forest Service². Laurel wilt beyond the Atlantic and Gulf Coastal Plains: limitations and secondary effects.

[Abstract: In the southeastern United States, several native tree species in the laurel family (Lauraceae) are being eradicated by an exotic wood-boring beetle and its fungal symbiont. The beetle and its fungal symbiont form the disease complex, laurel wilt (LWD). The fungal symbiont, Raffaelea lauricola, is the causal pathogen of LWD and is spread to native and non-native Lauraceae by the highly mobile and cryptic redbay ambrosia beetle (RAB), Xyleborus glabratus Eichoff. The beetles target apparently healthy trees and are remarkably effective at colonizing populations of Lauraceae in a brief time period. Current estimates of trees killed by LWD are ~500 million, and if the beetle continues to spread unabated, >300 insect herbivore associates of North American Lauraceae may be negatively impacted, most notably the palamedes swallowtail butterfly (Papilio palamedes Drury). The palamedes is endemic to the southeastern United States and is solely dependent on redbay, the most widely killed Lauraceae to date, as a host. Survey data in Mississippi and North Carolina from 2012-2014 and 2013-2014, respectively, has shown a ~3-7 fold reduction in butterfly numbers in LWD-infected stands. Unfortunately, control methods have been unable to slow the spread of LWD and X. glabratus has quickly established as far North as North Carolina. Low temperature may be the only factor limiting establishment of the beetle throughout North America. Therefore, low temperature mortality assays were conducted on natural and artificially cold acclimatized sample populations to predict the spread potential of RAB in North America. Subsequently, the mortality data were analyzed to determine the temperatures lethal to 50-100% of the population. These derived data were then combined with climatic, microhabitat, and Lauraceae host data to model the invasion potential of RAB/LWD in North America. Based on the results of the lethal temperature and model building analyses, RAB should be able to spread into many, if not all, laurel rich forests regardless of winter temperatures. Sharing this model data will help land managers, forest health specialists, urban foresters, and landowners make informed, proactive management decisions regarding LWD.]

Juang-Horng “JC” Chong¹, Christopher Ranger², and Christopher Werle². Clemson University¹ and USDA-ARS². Scolytines at ornamental plant nursery-forest interface: A pest challenge now and in a changing world

You Li, Craig C. Bateman, Rabern Simmons, and Jiri Hulcr. University of Florida. Pathogenicity evaluation of exotic ambrosia beetle-vectored fungi in Florida.

[Abstract: Exotic ambrosia beetles (Coleoptera: Curculionidae: Scolytinae) are important pests of forests in the southeastern United States. These beetles tunnel into trees and inoculate one or multiple symbiotic fungi, which are then consumed by adults and larvae. Some exotic fungal
symbionts of ambrosia beetles have become invasive pathogens of American trees, including *Ophiostoma novo-ulmi* on elms (*Ulmus* species) and *Raffaelea lauricola* on redbays (*Persea borbonia*). As new exotic beetle species continue to enter the US, an important question is whether their associated fungi are pathogenic to native tree species. The aim of this project to help regulatory agencies to make evidence-based decisions to distinguish which species can be ignored if introduced, which require close monitoring and further research, and which species need eradication if introduced. To address this question, we developed a safe and feasible approach to assessing the threat of fungi associated with exotic ambrosia beetles before their establishment in the US. Ambrosia beetles were collected in foreign countries where their symbiotic fungi were isolated. The most abundant associates of each beetle were inoculated on native host trees in a quarantine greenhouse. In the first two seasons, we inoculated 20 fungal isolates on native pines or oaks and monitored for signs and symptoms of pathogenicity. Most fungi were found to be not pathogenic, but some were mildly pathogenic to loblolly pine (*Pinus taeda*) and slash pine (*Pinus elliottii*), such as *Leptographium* sp. from *Dendroctonus micans* in Czech Republic, *Ophiostoma ips* and *Graphilbum rectangulosporum* from *Orthotomicus erosus* in Israel. Some fungi were mildly pathogenic to oak trees. *Geosmithia* sp. from *Webbia pabo* and *Ophiostoma* sp. from *Cyclorhipidion fukiensis* in China were mildly pathogenic to shumard oak (*Quercus shumardii*) and live oak (*Quercus virginiana*), respectively. However, no fungus has proven to be a virulent pathogen of biosecurity concern. Testing for potential pathogens will continue with target beetles throughout Asia.

Jim Hanula, Scott Horn, Mike Ulyshen and Mac Callaham. USDA-FS-SRS. A growing problem: the impact of the invasive shrub, Chinese privet, on riparian forests.

**C. Open Session I (Organizer: JT Vogt, USDA-FS-SRS-FIA) - Eureka Springs B**

Brian Sullivan¹, Will Shepherd¹, Amanda Grady², Rich Hofstetter³, and Jeremy Allison⁴. USDA-FS-SRS¹, USDA-FS-FHP², University of Northern Arizona³, and Natural Resources Canada⁴. Newly-identified pheromone blends and species associations for some forest insects of the US.

David Wakarchuk¹ and Daniel Carrillo², Synergy Semiochemicals Corp¹ and University of Florida². Xyloborini Invaders Poised for Action on Both Coasts.


**Abstract:** The Texas Forest Service (TFS, now Texas A&M Forest Service) initiated the Forest Pest Management Cooperative in March, 1996. The original purpose was to generate sufficient funds from membership dues to support continued research on pests of pine seed orchards and young pine plantations. The FPMC has been in business for 19 years. With significant financial support from TFS, the cooperative has survived economic strife and changing landownership patterns where many other forestry cooperatives have not. In recent years, the focus of research efforts has included forest health issues in urban trees and non-commercial forests. Since most tax-paying citizens are urban dwellers, new technology to maintain healthy trees and forests is of primary interest to these stakeholders.

Donald M. Grosman, a recent graduate of Virginia Polytechnic University with a Ph. D. in forest entomology, was hired as the first Coordinator of the FPMC. He provided dedicated service to the FPMC for sixteen years, before leaving to assume a position with Arborjet, Inc., in January, 2013. Largely as a result of Dr. Grosman’s leadership, dedication and work ethic, substantial research accomplishments were achieved and several chemical insecticides were brought to the market to address pest problems in commercial pine seed orchards, young pine plantations, and urban trees. Among these were emamectin benzoate (sold as TREE-age™) for coneworm, bark beetle, and wood borer control; Volcano™ (sulfuramid) and PTM™ (fipronil) for Texas leafcutting
ant control; Pounce™, Arctic™ and Waylay™ (permethrin) for regeneration weevil prevention; and SilvaShield™ Forestry Tablets (imidacloprid) and PTM™ for pine tip moth. During this period, membership in the FPMC increased from 4 to 12 members.

Other accomplishments included 1) the generation of close to $1 million in federal and chemical company research grants in the first sixteen years to supplement FPMC budgets; 2) numerous scientific publications; 3) the quarterly newsletter PEST (Progress Education, Science, and Technology), 4) technical assistance to members, 5) injection workshops for landowners and arborists throughout Texas; and 6) comprehensive annual reports.

When Dr. Grosman left the FPMC at the end of 2012, Dr. Melissa Fischer, also a graduate of VPI, was hired as coordinator in September, 2013. She provided leadership until November, 2014, when she accepted another position with the Department of Natural Resources in Washington State. During her 14 months as coordinator, she and the field staff in Lufkin continued field studies already underway and initiated new ones on tip moths, cedar bark beetles, hypoxylon canker, pinewood nematodes, sweetgum fruit production and conifer mite control. In February 2015, Dr. Ronald Billings became coordinator of the FPMC from his headquarters in College Station. New goals of the coop are to increase the proportion of funding from sources other than TFS (i.e., new members and research grants) and to increase applied research efforts in urban forest health. Currently, the FPMC has 8 full members and 4 associate members, while the field staff in Lufkin consists of one staff forester, one research specialist, one seasonal worker, and office support.

JT Vogt, M. Brown, and F.A. Roesch. USDA-FS-SRS-FIA. The hemlock woolly adelgid in western North Carolina – what do the FIA data tell us?

[Abstract: Hemlock (Tsuga sp.) is threatened throughout its range in the eastern United States by the invasive pest Adelges tsugae, or hemlock woolly adelgid (HWA). The first collections of HWA in North Carolina occurred in the mid-1990s. In the early 2000s infestations were generally characterized as light and scattered, but by 2007 all mountainous counties in the western portion of the state were infested and widespread mortality was observed in some areas.

The USDA Forest Service’s Southern Research Station, Forest Inventory and Analysis (FIA) program, in partnership with the southern states, conducts an annualized inventory of forest resources across all land ownerships from Texas to Virginia and points south utilizing a network of plots randomly placed within polygons of approximately 6000 acres each. Up until the late 1990s the FIA program conducted periodic forest inventories of each state. A sample of trees associated with a set of permanent points in a state was measured in its entirety. The most common (variable-radius) tree selection rules sampled trees in proportion to their size. The set of points were then remeasured ten or more years later, usually, but not always, by reapplying the same tree selection sampling rule. Different tree selection designs were often used in different states and these disparate designs made it difficult to reliably track the growth and health of individual trees. With the change in 1998 to an annualized inventory in which 10 to 20% of the plots in a state are measured each year, utilizing a consistent (fixed-radius) tree selection design, data began to accumulate more frequently on individual trees, making the data more useful to users interested in examining the effects of pests and pathogens on tree health. We utilized re-measured tree data from 2003 through 2013 to examine the potential effects of years since HWA infestation (at the county level; data from North Carolina Department of Agriculture and Consumer Resources), crown dominance, and site variables (elevation, aspect, slope, site productivity) on annualized diameter growth for hemlock in the 21 mountainous counties in western North Carolina. Site variables explained little variation in hemlock growth, but years since HWA infestation had a highly significant negative effect on growth, reducing predicted growth by approximately 7 to 9 percent for each year of infestation. Interestingly, crown dominance was negatively correlated with growth; however, our analysis was run on a (presumably healthier) population of surviving trees which may have confounded the results. Work is ongoing to better discern these relationships as well as examine potential effects of site and tree characteristics on mortality in HWA-infested areas.]

10:15 - 10:45 AM  Break
A. Pests, Decomposition, and Nutrient Cycles in Forest Ecosystems
(Organizers: Natalie Clay & John Riggins, Mississippi State University) - Eureka Springs A

Halvor M. Halvorson¹, Sally A. Entrekin², Michelle A. Evans-White¹, Chris L. Fuller², J. Thad Scott³, and Ayla Smartt¹. University of Arkansas Department of Biological Sciences¹, University of Central Arkansas Department of Biology², University of Arkansas Department of Crop, Soil, and Environmental Sciences³. Bottom-up effects of leaf type and nutrients on detritivore functional roles in stream ecosystems.

Jim Hanula and Mike Ulyshen. USDA-FS-SRS. Do ground-dwelling insects need coarse woody debris and do saproxylic insects influence its decomposition?

Natalie Clay¹, Nathan Little², and John Riggins¹. Mississippi State University¹, USDA-ARS². Interactions among bark beetles, blue stain fungi, and termites enhance decomposition and biodiversity.

B. Current and Potential Exotic Species and Their Impacts in the SE US, Part II.
(Organizer: David Coyle, University of Georgia) - Bella Vista

Jerome Grant¹, Gregory Wiggins¹, Paris Lambdin¹, Mark Windham¹, and Paul Merten². University of Tennessee¹ and USDA FS FHP². Thousand Cankers Disease on Black Walnuts in Southeastern Forests: Present, Passive, Prevalent or Problematic?


Bill Davidson and Lynne Rieske-Kinney. University of Kentucky. Developing a sustainable approach for managing invading populations of the emerald ash borer.

[Abstract: Agrilus planipennis Fairmaire (Coleoptera: Buprestidae) is a wood boring pest of Asian origin which has caused widespread mortality of ash, Fraxinus spp., in North America since its introduction in the 1990s. Studies conducted at the epicenter of the infestation in the Great Lakes region have discovered several species of native parasitoids capable of utilizing A. planipennis, however little is known of how these natural enemy complexes vary across the shifting forest types and habitats encompassed by the expanding infestation. We characterized the assemblage of native natural enemies being recruited to A. planipennis at five sites in north-central Kentucky, where infestations have been documented since 2009. Through destructive sampling, dissection, and rearing of infested ash material twelve native parasitoid morphospecies were found being recruited to A. planipennis, nine of which have not been reported previously. Catogenus rufus (Fabricius) (Coleoptera: Passandridae), Phasgonophora sulcata Westwood (Hymenoptera: Chalcididae), and Leluthia asgtigma (Ashmead) (Hymenoptera: Braconidae) have been discovered utilizing A. planipennis in more northerly infested regions of North America and were present in our study. Native hymenopteran parasitoid responses to A. planipennis-induced ash decline, measured using visual assessments of canopy decline, revealed a positive correlation between parasitoid guilds and ash decline.]

Frank Sapio. USDA-FS-FHP (FHTET). Digital Mobile Sketch Mapping, a new approach for forest pest reporting.

James Ellenwood. USDA-FS-FHP (FHTET). Forest disturbance mapper and nationwide operational remote sensing.

William W. Hargrove\(^1\), Steve P. Norman\(^1\), and Joseph P. Spruce\(^2\). USDA-FS-SRS (EFETAC)\(^1\), Stennis Space Center\(^2\). ForWarn, a national satellite-based forest disturbance detection system, and other uses of phenology and remote sensing data for large-scale vegetation monitoring.

Robert N. Coulson, Maria D. Tchakerian, and Andrew Birt. Texas A&M. Monitoring non-target pesticide exposure from forestry applications to adjacent sensitive crops.

12:15 - PM Lunch On Your Own

Afternoon Activities

12:15 - 2:30 PM

Forest Health Field Trip (Organizer: Jessica Hartshorn & Larry Galligan). Current research evaluating *Monochamus* biology and ecology.

1:00 - 5:00 PM

Frontalis Cup @ Stonebridge Meadows Golf Club (Organizer: Fred Stephen)

2:30 - 5:00 PM

Frustrana Cup @ the Green Submarine (Organizer: Steve Clarke)

7:00 - 9:00 PM Banquet

Insect Photo Salon (Organizer: Ron Billings, Texas A&M Forest Service)

Graduate Student Presentation Awards and Roger F. Anderson Award
Friday, July 24th

Breakfast on your own

8:00 - 9:30 AM   Concurrent Session III

A. Open Session II (Organizer: Ron Billings, Texas A&M Forest Service) - Eureka Springs A


[Abstract: In recent years, States in the West have experienced a couple unprecedented and unusual forest insect outbreaks. A mountain pine beetle (Dendroctonus ponderosae, Hopkins) outbreak has affected millions of acres of primarily lodgepole and ponderosa pines. The mountain pine beetle (MPB) differs from the southern pine beetle in that it has only one generation per year. The first MPB activity was noted in British Columbia around 2001 and peaked about 2007 when over 5.3 million hectares were affected in southern BC and almost 10 million hectares for the Provence. Lands in BC are owned by the Crown but are managed by private industry for long term sustainable harvest. This outbreak had considerable impact on current and future timber management. Around the same time, in 2003, populations of MPB were increasing in Washington, Oregon, and Colorado. These infestations peaked in 2009 with almost 900,000 acres with mortality in Washington and Oregon and 1.1 million acres of mortality in Colorado. Since 2009, the outbreak has continued to decrease in all affected areas as trend graphs indicate. In addition to timber, the outbreak has had significant impact on aesthetics and recreation, increased fuel loads, recreation and roadside safety from hazard and danger trees, and impacts on the high-elevation five-needle pines.

The recommended treatment to mitigate mpb outbreaks is thinning to open the stand to increased air flow, and reduce competition allowing the trees to become more vigorous. Recent climate events such as hotter, drier summers with below average precipitation and drought conditions have also increased susceptibility. Recent work has shown that through a combination of day-lighting (removing vegetation competition immediately around a tree) and lower crown pruning has been successful in minimizing mpb attacks on the high elevation pines.

A second and more unusual outbreak of pine butterfly (Neophasia menapia (Felder and Felder)) occurred recently in northeastern Oregon. Outbreaks of this insect are a rare, once-in-a-career event – about once every 30 years. The outbreak in Oregon began in 2009 and collapsed in 2013. Peak defoliation occurred in 2011 when over 250,000 acres were defoliated, primarily on the Malheur National Forest and adjacent lands. Larvae hatch in the spring around June and feed gregariously on the older needles. Pupae appear in late summer and the adults emerge in the fall, around August to October. At the same time, there was an outbreak of a sawfly, so both insects could be found feeding side by side on the old needles. There was some concern that the defoliation would cause mortality, or increase susceptibility to MPB in the mature ponderosa pine. However, to date, no significant tree mortality to mature pines has been recorded. The collapse of the outbreak was due to predator and parasitic insects. The outbreak was so severe that a solid layer of butterflies covered the ponds and the large number of flying butterflies occasioned the Interagency Aviation group to issue a Safety Alert warning pilots of impaired flight visibility due to extreme windscreen and fuselage butterfly strikes.]

Don Grosman, Arborjet Inc., and Akif Eskalen, University of California – Riverside. Polyphagous shot hole borer and Fusarium dieback: potential bug and crud invaders to the Southeast.

David Wakarchuk, Synergy Semiochemicals. Tales from out on the Perimeter: Parsimony in Chemical Ecology.
David Coyle¹, Brittany Barnes¹, Gary Green¹, Kier Klepzig², John Nowak³, and Kamal Gandhi¹. University of Georgia¹, USDA-FS-SRS², and USDA-FS-FHP³. Regional relevance of southern pine decline and its impact on landowner knowledge and attitudes.

[Abstract: We assessed awareness and perceptions of forest landowners and managers in the southeastern U.S. regarding their stand health, especially under the context of the southern pine decline (SPD) phenomenon. Email and paper surveys were sent to 4,670 forest landowners and managers in Florida, Georgia, and South Carolina with an overall response rate of 28%. About half (51%) of the respondents reported having healthy and symptom-free pine stands, and only 11% reported elevated levels of dying pine or pine mortality within the last year. Few (< 30%) respondents were aware of SPD. Insects, disease, and drought were perceived as the most important threats to pine health. Respondents usually utilized material from state agencies, professional speakers, or research publications for information regarding pine stand management. Data seem to indicate a favorable outlook for pine health in the southeastern U.S., as landowners appeared to be engaged and willing to use recognized management prescriptions.]

B. Ten Years of Sirex Research: What Have We Learned and What Do We Expect? (Organizers: Laurel Haavik, Ohio State University, Jim Meeker, USDA-FS-FHP, and Kamal Gandhi, University of Georgia) - Bella Vista

Jim Meeker. USDA-FS-FHP. Introduction with overview on concern for S. noctilio in the south, framework for session and discussion, management needs and options.

Kevin Dodds. USDA-FS-FHP. Is Sirex a threat to southeastern forests? Insights from studies in northern pine forests.

Christopher Foelker, Christopher Whipps, Dylan Parry, and Melissa Fierke. State University of New York. Sirex noctilio in the northeast: interactions with native parasitoids and co-colonizers

Ann Hajek. Cornell University. Interactions between native and introduced Sirex, fungus and nematodes

Kamal Gandhi¹, Brittany Barnes¹, Jamie Bookwalter¹, Derek Robertson¹, Chris Asaro², James Meeker², Daniel Miller³, Wood Johnson², John Riggins⁴, Will Shepherd³, and Brian Sullivan³. University of Georgia¹, USDA-FS-FHP², USDA-FS-SRS³, and Mississippi State University⁴. Community, population, and chemical ecology of Sirex and their parasitoids in the Southeast.

Jessica Hartshorn, Larry Galligan, and Fred Stephen. University of Arkansas. A synthesis of Sirex nigricornis research in Arkansas

Laurel Haavik¹ and Jim Meeker². The Ohio State University¹ and USDA-FS-FHP². Discussion on important implications from talks and management strategies for the south.
C. Urban Forests . . . The New Frontier. (Organizer: Lynne Rieske-Kinney, University of Kentucky) - Eureka Springs B

Ed Macie. USDA Forest Service Southern Region. Urban Forest Sustainability

Jiri Hulcr. University of Florida. Ambrosia beetle ecology and damage in urban versus wildland versus nurseries and orchards.

Derek Linn. City of Fayetteville. Fayetteville's urban forest.


9:00 - 10:00 AM Break

10:00 - 11:30 AM Concurrent Session IV

A. Mitigation of Invasive Species and Their Impacts. (Organizer: Bud Mayfield, USDA-FS-SRS, and Bob Rabaglia, USDA-FS-FHP) - Eureka Springs A

Welcome and brief introductory remarks.

Phillip Baldauf, John Burch, Josie Ryan, and Robyn Rose. USDA-APHIS-PPQ. Eradicating the Asian longhorned beetle from the US.

[Abstract: The Asian longhorned beetle (Anoplophora glabripennis), or ALB, is an invasive insect that feeds on a wide variety of trees in the United States, eventually killing them. The ALB most likely came to the United States inside wood packing material from Asia. Since its first discovery in Brooklyn, NY, in 1996, the beetle has been found in a total of five U.S. States—New York (1996), Illinois (1998), New Jersey (2002), Massachusetts (2008), and Ohio (2011). APHIS and its cooperators have eradicated infestations in Illinois; New Jersey; Manhattan, Staten Island, and Islip, NY; and Boston, MA. Eradication efforts continue in Brooklyn and Queens, NY; on central Long Island, NY; in Worcester County, MA; and in Clermont County, OH. In states where infestations have been found, the U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) partners with Federal and State agencies to find and destroy ALB infestations. Given the ALB's destructive potential, the agency's goal is eliminate beetle populations in the United States. To achieve this goal, APHIS and its partners: establish quarantines to restrict the movement of regulated materials, inspect ALB host trees from the ground or aerially for signs of infestation, apply a preventative systemic insecticide to uninfested host trees, remove infested and high-risk host trees within quarantined areas, research best practices and eradication methods, and involve and educate the public.]

Yanzhuo Zhang1, Jim Hanula2, Scott Horn2, Kris Braman1, University of Georgia1, USDA-FS-SRS2. Lace bug, Leptoypha hospita (Hemiptera: Tingidae), a potential biocontrol agent of invasive Chinese privet.
Rusty Rhea. USDA Forest Service FHP. Hemlock woolly adelgid suppression efforts in the southern US: where are we, and where are we headed?

Robert Jetton1, Andrew Tait1, and Albert (Bud) Mayfield2. Camcore-North Carolina State University1 and USDA-FS-SRS2. Gene conservation and silvicultural restoration strategies for mitigating the impact of the hemlock woolly adelgid.

Closing comments and discussion.

B. Beetles Without Borders (Organizer: Steve Clarke, USDA-FS-FHP) - Eureka Springs B


[Abstract:  Some risk rating methods classify stands as low, intermediate, or high risk of attack. This study aimed to use data to calculate absolute risk of trees being attacked within one year. The goal of this study was to examine the shifts between endemic and epidemic populations and to develop tree-level risk models for predicting bark beetle-caused mortality. To complete the goal, the objectives were to 1) analyze tree, stand, and beetle pressure variables to understand how they influence shifts in the population density, 2) develop an absolute risk model based on the 21 years of field data that was collected and 3) produce a framework for applying risk models to individual trees in the landscape. In 1995, forty-five sites were established throughout the southwestern US to measure bark beetle activity and associated tree and stand characteristics. The plots were periodically revisited through 2012 resulting in over twenty years of bark beetle data with highly variable population densities over time and space. Site maximum dbh and the number of ponderosa pines per acre were significant (P < .029) for predicting the probability a rise in the population density of bark beetles. Tree, stand, and beetle pressure were significant (P < .001) in predicting the probability of beetle caused tree mortality per year. Using GIS, remote sensing, and ground truth data, a ponderosa pine forest was simulated with information about the size and configuration of trees in the landscape. This simulated landscape was used to develop a framework for tree-level risk assessments. The results are discussed further in the context of bark beetle management and further research opportunities.]


[Abstract: Within the Central American region, the newly-described pine beetle Dendroctonus mesoamericanus is typically found colonizing trees jointly with the southern pine beetle Dendroctonus frontalis. In the laboratory, forced heterospecific pairings (i.e., confinement of males over female gallery entrances) resulted in mating, sperm transfer, gallery formation, and larval brood. However, differing numbers of chromosomes in the two species imply that they cannot produce fertile hybrids and that heterospecific pairings are a genetic dead-end. Laboratory olfactometer studies of these two species by PhD candidate Alicia Niño-Domínguez indicated that males of both species were strongly attracted to odors of gallery entrances of conspecific females but not heterospecific females. Hence female-associated semiochemicals are cues that likely reduce the possibility of interspecific pairing and promote reproductive isolation. endo-Brevicomin and ipsdienol (pheromone components produced by D. mesoamericanus but
Ron Billings\textsuperscript{1} and Steve Clarke\textsuperscript{2}. Texas A&M Forest Service\textsuperscript{1} and USFS-FHP-R8\textsuperscript{2}. Southern pine beetle outbreak in Honduras (again).

[Abstract: The most recent outbreak of southern pine beetle (SPB, Dendroctonus frontalis) in Honduras began in August 2013 in the Olancho Region of central Honduras. By November, 2014, when the authors participated in a technical assistance visit (TAV), the outbreak was largely uncontrolled and covered an estimated 10,000 has. Objectives of the TAV were to evaluate the current outbreak, provide recommendations for suppression, and offer a two-day training course in Spanish on bark beetle detection, evaluation, suppression and prevention. Obstacles to suppression included poor access, lack of markets, need for armed security in the field, an influx of untrained forestry personnel, and insufficient funds to apply known control methods. Following the short course for some 30 Honduran forestry technicians, a meeting was held with potential national and international donors to generate funds for immediate suppression. Recommendations were provided and bark beetle management field guides in Spanish were distributed to forestry personnel. Prompt application of cut-and-leave to the leading edge of expanding infestations (shown to be effective in controlling previous SPB outbreaks in Central America), followed by efforts to restore affected lands to pine forests, and re-establishment of an operational bark beetle data base were among the recommendations given.]

Matt Ayres\textsuperscript{1} and Kevin Dodds\textsuperscript{2}. Dartmouth College\textsuperscript{1} and USFS-FHP-NE\textsuperscript{2}. Southern pine beetle in the Northeast.

[Abstract: Southern pine beetle was discovered in the southern New Jersey Pinelands in 2001. It has remained active there since then and has expanded northward. Monitoring and suppression by the NJ Forest Service, with support from Forest Health Protection, has thus far been effective in minimizing SPB activity north of the Mullica River, where there are large tracts of monospecific, high basal area, pitch pine that are at high risk from SPB. Unfortunately suppression activities by NJ Forest Service are ending due to lack of resources. In fall of 2014, SPB was reported and verified on Long Island, which was the first known record of SPB in NY. This triggered the rapid development of an SPB management coalition in NY State that includes US Forest Service FHP, NY DEC, US Fish & Wildlife Service, National Park Service, Central Pine Barrens Commission, and New York Parks. Monitoring via pheromone traps in spring 2015 detected SPB in CT, RI, MA, and upstate NY. Management plans are evolving, but are complicated...]

not \textit{D. frontalis} females) were determined to be the specific compounds that mediated this discrimination: these compounds enhanced attraction of walking \textit{D. mesoamericanus} males but inhibited attraction of walking \textit{D. frontalis} males. Results of subsequent trapping tests differed sharply from results of these olfactometer trials. Logs infested with solitary \textit{D. mesoamericanus} females were more attractive to both species (and both sexes of \textit{D. frontalis}) than logs infested with \textit{D. frontalis} females. Additionally, attraction of both sexes of \textit{D. frontalis} to traps was enhanced (rather than inhibited) by \textit{endo}-brevicomin, as has been observed previously. As in the olfactometer trials, \textit{D. frontalis} attraction was inhibited by ipsdienol [specifically, the (+)-enantiomer]. For, \textit{D. mesoamericanus}, results of trapping tests were consistent with laboratory tests, with ipsdienol and \textit{endo}-brevicomin increasing beetle response, although catches were sufficient to detect this preference in only one of three tests. Preference of flying \textit{D. frontalis} for odors of attacks by \textit{D. mesoamericanus} females was likely caused by the latter's production of both components of the \textit{D. frontalis} aggregation pheromone (frontalin and \textit{endo}-brevicomin); \textit{D. frontalis} females produce only frontalin. Attraction of flying but not walking male \textit{D. frontalis} to odors associated with attacks by female \textit{D. mesoamericanus} likely reflects different functions of attractive responses by these beetles either before (host-seeking) or after (mate-seeking) arriving on the host. The data suggest that pioneer attacks by \textit{D. mesoamericanus} females could induce attraction by both species and might be more effective at inducing a mass-attack than pioneer attacks by female \textit{D. frontalis}. Thus within the \textit{D. frontalis} / \textit{D. mesoamericanus} association, \textit{D. mesoamericanus} may be the species primarily responsible for initial selection of hosts; however, field observations are so far ambivalent regarding whether this is the case.]
by property ownership and expenses. The lack of markets to support forest management expenses will be a prominent challenge.

Discussion. SPB outbreaks now more common outside of the southeastern US. Why?

C. Teaching Forest Protection: What’s Relevant Today? (Organizers: Bob Coulson, Texas A&M University, John Riggins, Mississippi State University) - Bella Vista

Roundtable Discussion Speakers:

Robert Coulson, Texas A&M University
John Riggins, Mississippi State University
Mohammad Bataineh, University of Arkansas, Monticello
Kamal Gandhi, University of Georgia
Jerome Grant, University of Tennessee
Jiri Hulcr, University of Florida
Robert Jetton, North Carolina State University
David Kulhavy, Stephen F. Austin University
Rose-Marie Muzika, University of Missouri
Lynne K. Rieske-Kinney, University of Kentucky
Scott Salom, Virginia Tech
Fred Stephen, University of Arkansas, Fayetteville

11:30 – 12:15 PM   Closing Business Meeting (Organizer: Kier Klepzig, USDA-FS-SRS) - Bella Vista


3. Louela Castrillo, John Vandenberg, Michael Griggs, Robert Camp, Adam Taylor, and Albert Mayfield. Cornell University, USDA-ARS, University of Tennessee, and USDA-FS-SRS. Initial report on the virulence of *Beauveria bassiana* and *Metarhizium brunneum* against *Pityophthorus juglandis* and impact on brood production.

[Abstract: Thousand cankers disease (TCD), caused by the walnut twig beetle (WTB), *Pityophthorus juglandis*, and its associated fungal symbiont, *Geosmithia morbida*, is a deadly disease of the eastern black walnut, *Juglans nigra*. Numerous attacks and gallery formation by the WTB and subsequent development of cankers caused by the fungus result in progressive crown dieback, killing affected trees in one to several years following initial infestation. Very few management options are available for preventing or reducing impact of TCD on black walnut trees. Since the development of TCD requires numerous beetle attacks before cankers coalesce and girdle branches, and multiple beetle generations likely result in crown dieback, control strategies that reduce beetle attacks and brood production, without completely eliminating infestation, could still significantly benefit tree health and survival. We are evaluating the use of entomopathogenic fungi *Beauveria bassiana* and *Metarhizium brunneum* against the WTB. Laboratory and field studies conducted in 2014 showed that WTB adults are susceptible to both entomopathogenic fungi. In addition, exposure of these adults to sprayed walnut logs resulted in smaller brood production. This is due to the death of adults from and infection of their brood by fungal inocula introduced into the gallery or produced after their death. These results suggest the potential use of entomopathogenic fungi in the integrated management of TCD.]

4. Ryan Crandall, Christopher Foelker, and Melissa Fierke. State University of New York. Woodwasp (*Sirex noctilio*) venom and pine host species affect growth of fungal symbiont (*Amylostereum areolatum*).


[Abstract: Because of its loss from eastern deciduous forests due to the exotic chestnut blight fungus, little is known about the effects of fire on American chestnut (*Castanea dentata*) and how changes in disturbance may alter vulnerability to insect herbivores, including the gypsy moth (*Lymantria dispar dispar*). Forest fires may alter herbivory through changes in light and nutrient conditions. In this study forest soil was collected from a recent wildfire and from an adjacent unburned area to grow blight-resistant backcross American chestnut seed in full and reduced light (70% shade) using a 2×2 design in the greenhouse. This design included the main effects of soil (burned versus unburned) and light (full sun versus shade). Chestnut seedlings grown in burned soil and full sun had greater height growth and leaf availability than those grown in unburned soil and shade (*F*<sub>1,18</sub> = 12.0, *P* ≤ 0.05, and *F*<sub>3,18</sub> = 4.8, *P* ≤ 0.05, respectively). After 4 weeks seedling leaves were excised and fed to fourth instar gypsy moth caterpillars starved for...]

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48 h. To test the effects of soil and light on caterpillar performance, changes in caterpillar and leaf weights (%) were fitted to a generalized linear model. No differences were detected in consumption of leaf material \((P > 0.05)\), but caterpillars fed leaves grown in shade had greater mass than those fed leaves grown in full sun at the end of the 24 hr feeding trial \((F_{3,38} = 4.9, P \leq 0.05)\). These data indicate that gypsy moth caterpillars may not alter their consumption of chestnut seedlings grown in soil burned by fire, but they may not grow as large under the increased light typical of burned forests. Understanding the effects of fire on chestnut, and discerning how fire may influence its native and non-native insect associates, is essential for the long-term success of chestnut reintroduction.

6. Shelby Fulton\(^1\), Luke Dodd\(^2\), and Lynne Rieske-Kinney\(^1\). University of Kentucky\(^1\) and Eastern Kentucky University\(^2\). Is bigger really better? Assessing caloric value of lepidopterans as bat prey.

[Abstract: While bats consume a variety of nocturnal insects, Lepidopterans are the primary prey for many bats in North America. To develop a method to better understand the energetic profitability of this core resource, the caloric content of cabbage looper moths \((Trichoplusia ni)\) and eastern tent caterpillar moths \((Malacosoma americana)\) were determined using bomb calorimetry. Cabbage looper caterpillars were reared on artificial diet to adulthood, whereas eastern tent caterpillars were field-collected as larvae and completed their development on field-collected foliage. Finely ground samples of newly-emerged eastern tent caterpillar moths (individual masses of 241 ± 2.5 mg) were combusted to determine mean gross heat generated (cal/g). Emerging cabbage looper moths were subsequently divided into large and small size classes (individual masses of 118 ± 0.80 and 87 ± 0.69 mg, respectively), and mean gross heat values were determined for four treatments (small with wings present, small with wings removed, large with wings present, and large with wings removed). No differences were detected between the caloric yield of cabbage looper moths and eastern tent caterpillar moths \((P > 0.05)\). Mean gross heat differences between small and large cabbage looper moths were insignificant \((P > 0.05)\), as were differences between winged and wingless cabbage looper moths \((P > 0.05)\). These results indicate consistency in the calorimetry procedure, as both cabbage looper moths and eastern tent caterpillar moths are of relatively similar size. Further, these preliminary results indicate that foraging behavior by bats (e.g., removal of the wings of prey by Corynorhinus) does not afford a caloric benefit (or detriment), and may be more an indication of palatability. Continuing assays will expand this research to include field-collected Lepidoptera across the breadth of families (and sizes) of moths found in eastern North America, with the intent to determine the role that caloric profitability may play in the selection of prey by insectivorous bats.]


8. Tim McCoy, Mark Chivvis, and Scott Salom. Virginia Polytechnic Institute and State University. Fate of emerald ash borer in green ash in south-central Virginia.

9. Rabiu Olatinwo\(^1\), James Meeker\(^2\), Wood Johnson\(^2\), and Christopher Carlton\(^3\). USDA-FS-SRS\(^1\), USDA-FS-FHP\(^2\), and Louisiana State University\(^3\). Genetic variability among \(Amylostereum areolatum\) isolates from native \(Sirex nigricornis\) (Hymenoptera: Siricidae) in Central Louisiana.

[Abstract: Molecular identification is important for monitoring genetic variability among species of \(Amylostereum areolatum\) (Chaillet ex Fr.) associated with native and non-native \(Sirex\) species across regions. Recent studies have suggested reciprocal exchange of \(A. areolatum\) fungal symbiont exists between non-native \(Sirex noctilio\) Fabricius and native \(Sirex nigricornis\) Fabricius
(Hymenoptera: Siricidae). Our objective was to examine and track the genetic identity of *A. areolatum* contained in the artificially stimulated ovipositional discharge from native *S. nigricornis*. Live adult female *S. nigricornis* specimens collected in Grant Parish, Louisiana were examined. DNA samples were amplified using basidiomycete-specific Intergenic Spacer (IGS) region primers. Fungal symbionts identified as *A. areolatum* using species-specific IGS primers were included in the phylogenetic analysis. Genetic variability and haplotype differences were observed among *A. areolatum* from *S. nigricornis* and *S. noctilio*. A fragment of DNA found in *S. noctilio* was noticeably absent in some sequences from native *S. nigricornis* in Canada and all sequences evaluated from Louisiana, USA. Results indicate a possible reciprocal exchange of *A. areolatum* fungal symbionts between non-native *S. noctilio* and native *S. nigricornis* in Canada. A routine genetic screening of *A. areolatum* in the native woodwasp may become necessary to monitor *A. areolatum* within native *Sirex* species populations in the southern forests.

10. Ashley Schulz[^1], Christopher Asaro[^2], David Coyle[^3], Michelle Cram[^3], Rima Lucardi[^3], Angela Mech[^1], and Kamal Gandhi[^1]. University of Georgia[^1], USDA-FS-FHP[^2], USDA-FS-SRS[^3]. What’s been “bugging” the white pine? Updates on the relationships within the eastern white pine - *M. macrocicatrices* - canker complex.

[Abstract: Eastern white pine (*Pinus strobus* L.) is an ecologically and economically important conifer species across the eastern region of North America. Recently, white pines in the eastern United States started showing signs of a lower branch dieback including branchflagging, resinosis, crown thinning, and canker development. A closer examination of the dying trees revealed a scale insect, *Matsucoccus macrocicatrices* Richards, which was found under lichen, in epiphytic mats, branch crotches, and cankers. Since eastern white pine dieback has become more prevalent, it has become essential to understand the eastern white pine-canker-*M. macrocicatrices* complex. We collected 270 white pine saplings from nine states in the eastern United States. On each of the saplings, we determined the number of *M. macrocicatrices*, size and location of cankers, and presence/absence of *Caliciopsis pinea* Peck. Results from this study indicate that there were positive correlations between *M. macrocicatrices* and sapling dieback (P < 0.001, r_s = 0.46), cankers and sapling dieback (P < 0.001, r_s = 0.62), and *M. macrocicatrices* and cankers (P < 0.001, r_s = 0.55) in the southeastern saplings (n = 246). Similar trends were seen in the northeastern saplings (n = 24). About 95% of the *M. macrocicatrices* sampled were associated with *C. pinea* or “other” cankers. Overall, there appears to be a relationship between dieback of eastern white pine saplings, and the presence of cankers and *M. macrocicatrices*. Future research may further evaluate the role of *M. macrocicatrices* and cankers in the dieback of eastern white pine in other parts of the white pine range.]


[Abstract: Biological control has been an important component of management of hemlock woolly adelgid (HWA), *Adelges tsugae*. Two species of predatory beetle (*Sasajiscymnus tsugae* and *Laricobius nigrinus*) have been released throughout the U.S. These species have established
throughout the southern Appalachians, and both species have been recovered in ca. 20% of release sites in the Great Smoky Mountains National Park (GRSM). The success of these predatory species is partially dependent on suitable climates that enable continued populations. From December 2013 through April 2014 record low temperatures, due to a southward shift in the North Polar Vortex, were experienced throughout much of the eastern U.S. The following winter, record low temperatures were observed in over 70 cities in the eastern and central U.S. during February 2015, due to a frigid air mass dubbed the ‘Siberian Express’. Low temperatures in some areas of Tennessee were at least 30°F below historical average lows for several consecutive days during both of these events. What impact have these recent climate events had on HWA and associated predator populations? HWA populations in several sites in eastern Tennessee were surveyed to during Winter 2014 and 2015. Greater percent mortality of HWA was observed during 2014 (ca. 88% overall) than 2015 (ca. 20% overall). Also, a Biological Control Demonstration Site established in 2013 in GRSM where L. nigrinus and S. tsugae were released was periodically sampled using beat-sheet sampling. Following the record cold temperatures in 2014 and 2015, only L. nigrinus was recovered from the Site, despite additional releases of S. tsugae (n = 400 adults) during Summer 2014. Due to its native range, L. nigrinus may be more tolerant of periodic frigid temperatures. S. tsugae may be less cold-tolerant, as its native range is similar to the southeastern U.S. Further monitoring is necessary in this and other release sites to assess the impact of climatological events like the Polar Vortex and Siberian Express on predators of HWA.]


15. You Li, D. Rabern Simmons, and Jiri Hulcr. University of Florida. How to preserve viable fungi in the mycangium of ambrosia beetles?
Minutes of the SFIWC Opening Business Meeting  
Wednesday, July 22, 2015  
The Chancellor Hotel  
Fayetteville, Arkansas

Chairman Kier Klepzig called the 57th meeting of the Southern Forest Insect Work Conference to order at 8:11 AM. He welcomed everyone to the meeting and thanked Will Shepherd, Fred Stephen, Bob Coulson, and John Riggins for organizing the event. Chairman Klepzig asked first-time attendees to stand and introduce themselves. The group then paused for a moment of silence in remembrance of retired SFIWC member, Harry O. Yates III, who passed away since the last meeting. Chairman Klepzig announced that the SFIWC Executive Committee decided to donate $100.00 to the Arbor Day Foundation in Harry’s memory. Members were invited to share announcements of professional transitions or retirements. Chris Asaro has started a new position with Forest Health Protection in Atlanta. Jiri Hulcr announced that University of Florida will be hiring three new post-docs.

Reports
Secretary-Treasurer Will Shepherd reported that minutes of the 2014 meeting in Charleston, South Carolina are available in the Proceedings on the SFIWC website. Financially, SFIWC had a checking account balance of $6,333.85 on 12/31/14. Income for the Charleston meeting exceeded expenses by $1,821.02.

Ron Billings read the Historian’s Report (see attached) with highlights of the three meetings previously held in Arkansas.

Photo Salon – Ron Billings stated that there were a large number of entries for this year’s Photo Salon. He said that there were three judges and that winners would be announced at the Awards Banquet on Thursday. He also asked that everyone participate in the group photos during the first break.

Common Names – Alex Mangini (not present) submitted a report stating that no proposed names had been submitted since the last meeting (see attached).

Website – Keith Douce not present.

Resolutions – Kamal Gandhi reported that there are no resolutions pending at this time.

Theses and Dissertations – David Kulhavy said that with theses and dissertations now available online, there may not be a need for this committee in the future.

Steve Clarke asked everyone to visit the registration table to donate non-perishable food items or money for SFIWC’s annual food drive. All donations will be sent to the Northwest Arkansas Food Bank on Friday.

Steve Clarke gave details on the Frustrana Cup washers tournament to be held on Thursday afternoon at Green Submarine.
Fred Stephen stated that six participants were signed up for the Frontalis Cup golf tournament to be held on Thursday at Stonebridge Meadows Golf Club.

Jess Hartshorn announced that the forest health field trip was at full capacity and would meet on Thursday, beginning at 12:15 PM with the location being weather-dependent.

Old Business

None.

New Business

Nominations – A new Counselor is needed to replace Robert Jetton for a three-year term on the Executive Committee. A Chair Elect is needed to eventually replace Kier Klepzig after the 2017 meeting. Voting on nominees will be held during the closing business meeting. Contact Robert or Kier if you wish to submit a nomination.

Chairman Klepzig announced that there would be no SFIWC in 2016. Instead, everyone is encouraged to attend the 2016 North American Forest Insect Work Conference. There will be a short SFIWC business meeting at NAFIWC 2016. Scott Salom said that NAFIWC 2016 will be held May 31-June 3, 2016 in Washington, D.C. at the Wardman Park Marriott Hotel. The planning committee is hard at work, and the meeting website is almost ready. See Scott Salom, Bob Rabaglia, Kier Klepzig, or Don Duerr with any questions.

Three locations were proposed for future SFIWC meetings (2017, 2018, 2019): Gainesville, Florida (Jiri Hulcr), Savannah, Georgia (Chip Bates), and San Antonio, Texas (Ron Billings). The order of locations still needs to be determined. Further discussion will be held at the closing business meeting.

Graduate Student Session – Molly Darr asked participating student to meet with her to load their presentations.

Poster Session – Fred Stephen asked everyone to attend the Wednesday night poster reception.

Steve Clarke read his proposal for the formation of a SFIWC History Committee to be chaired by the SFIWC Historian (see attached). The new committee would need up to three members.

There being no further business, the meeting adjourned at 8:36 AM.
A.D. Hopkins Award  
Thursday, July 23, 2015  
The Chancellor Hotel  
Fayetteville, Arkansas

A.D. Hopkins Award – Kier Klepzig, Committee Chair, thanked this year’s nominators, as well as committee members Chris Asaro, Kamal Gandhi, Anna Greis, Robert Jetton, Rabiu Olatinwo, and John Riggins. He reported that there was no winner this year.

Minutes of the Awards Banquet  
Thursday, July 23, 2015  
The Chancellor Hotel  
Fayetteville, Arkansas

Roger F. Anderson Award – Fred Stephen, Chair, thanked committee members Don Duerr, Kamal Gandhi, Jiri Hulcr, and Brian Strom. He announced that John Formby, a Ph.D. student of John Riggins at Mississippi State University, received the award. John accepted a check for $250.00. He will receive a personalized award plaque in a few weeks.

Graduate Student Presentation Awards – Robert Jetton, Graduate Student Session Chair, presented the Runner-Up award and $50 to Matthew Savage, an M.S. student working with Lynne Rieske-Kinney at University of Kentucky. The 1st Place award and $100 were presented to Elizabeth Benton, a Ph.D. candidate of Jerome Grant at University of Tennessee. Robert thanked the four judges: Don Duerr, Kier Klepzig, John Riggins, and Kimberly Wallin.

Chairman Klepzig reminded everyone to nominate officers.

Steve Clarke again asked attendees to give generously to the food drive.

Jiri Hulcr, Lynne Rieske-Kinney, David Kulhavy, Fred Hain, and Kamal Gandhi announced position openings at UF, UK, SFASU, NC State, and UGA, respectively.

Photo Salon – Ron Billings announced the 1st, 2nd, 3rd Place, and Honorable Mention winners in each category and thanked the judges (see attached). Ron said that 117 photos were submitted this year from 10 photographers, whom he thanked. The pictures will be forwarded to the Bugwood website.
Minutes of the SFIWC Closing Business Meeting
Friday, July 24, 2015
The Chancellor Hotel
Fayetteville, Arkansas

Chairman Kier Klepzig called the meeting to order at 11:39 AM.

Old Business

Steve Clarke moved that SFIWC form a History Committee to conduct interviews with Southern forest entomologists and archive forest entomology-related materials. The SFIWC Historian (Ron Billings) would chair the committee. The motion passed.

SFIWC Food Drive – Steve Clarke thanked everyone for their cash and canned goods donations. He did not yet have a money count, but would send a receipt to SFIWC Treasurer, Will Shepherd.

Frustrana Cup – Steve Clarke reported that 20 teams played in the washers tournament on Thursday afternoon and that the team of Alice Mandt and Mike Silliman won the event (Runners-up: Scott Salom and You Li).

Frontalis Cup – Fred Stephen announced that Bob Coulson won the 2015 Frontalis Cup golf tournament and presented Bob with the coveted trophy.

Meeting site for 2017, 2018, 2019 – Jiri Hulcr, Ron Billings, and Chip Bates announced that the tentative schedule for the next three SFIWC meetings is the following: 2017 (58th) – Florida; 2018 (59th) – Texas; 2019 (60th) – Savannah.

Election of Counselor – Kamal Gandhi and Jiri Hulcr were submitted as candidates for Counselor, 2015-2019. The members voted, and Kamal was elected Counselor.

Election of Chair Elect – Robert Jetton was submitted as the sole candidate for Chair Elect, 2015-2017. The members voted, and Robert was elected Chair Elect.

New Business

Jerome Grant invited anyone who wanted an emerald ash borer or thousand cankers disease information box to see him after the meeting.

Lynne Rieske-Kinney opened discussion of eliminating the student competition. She expressed concern that the competition created excess pressure for students and was not ideal for presentations of preliminary data. Robert Jetton, Graduate Student Session Chair, discussed the rules in place to keep preliminary data presentations out of the competition, and instead encourage those students to present a poster or in an open session. The general consensus among the membership was to keep the competition because it leads to more student recognition and helps prepare students for national competitions and professional presentations. Many of the
students present spoke in support of the competition, stating that the comments they have received have been helpful, and the award looks good on their CVs.

David Kulhavy moved that the Graduate Student Presentation Awards be increased to $200 and $100 for First Place and Runner-up, respectively. Matthew Ethington seconded. The motion passed.

Fred Stephen moved that the Roger F. Anderson Award be increased to $300. Don Grosman seconded. The motion passed.

Will Shepherd opened discussion to disband the Theses and Dissertations Committee. The general consensus among the membership was to keep the committee, but change its operation. The committee will now provide links to PDF files of theses and dissertations for inclusion on the SFIWC website. The committee also will report on students who have received their M.S. or Ph.D. degree.

A general discussion was held about adding old SFIWC Proceedings to the SFIWC website. The general consensus was that the newly formed History Committee should be responsible for this.

There being no further business, Chairman Klepzig thanked this year’s officers, organizers, moderators, and presenters who contributed to the 57th SFIWC.

Meeting adjourned at 12:09 PM.

Respectfully submitted,

William P. Shepherd, Secretary-Treasurer
Proposal for Formation of a Southern Forest Insect Work Conference
(SFIWC) History Committee

Purpose: The SFIWC History Committee will document the history of forest entomology in the southeastern United States by acquiring, collecting, and preserving historical materials including SFIWC Proceedings, photographs, letters, videos, presentations, and memorabilia. The committee will:

1) decide which materials to acquire and preserve;

2) update the SFIWC meeting summaries prepared by Harry O. Yates III for the period 1956-1980 (J. Georgia Ent. Soc., Vol. 8, 17, Supplement 1);

3) determine the best methods and repositories for the historical materials;

4) consider requests for usage of preserved materials; and

5) retain approval for the use of any materials specifically acquired or gathered by the committee in any publications, documentaries, presentations, or similar public communications.

The committee will be chaired by the SFIWC Historian. In addition, the History Committee will consist of up to 3 additional members serving open-ended terms, approved by the SFIWC Executive Committee.

Proposed initiation date: July, 2015.
Treasurer’s Report, CY 2015

SFIWC Income & Expenditures
January 1, 2015 – December 31, 2015

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This is the 57th Southern Forest Insect Work Conference but only our fourth visit to the State of Arkansas since the Conference began in 1956. Our 6th and 35th meetings also were held in Fayetteville in 1961 and 1990, respectively, while the 22nd conference was held in Hot Springs in 1977.

The 6th Work Conference was held on October 26-28, 1961 on the University of Arkansas campus and boasted 66 registrants. Larry A. Hetrick (University of Florida) was Chairman and Lloyd Warren (University of Arkansas) was Secretary Treasurer, while Robert Thatcher (U S Forest Service) served as Program Chair. The program theme was “Challenges to Southern Forest Entomologists.” But, no doubt, with southern pine beetle populations building up across the South and Thatcher as Program Chair, SPB was the major topic of discussion. A highlight event was a lecture entitled “Tarantula,” by W. J. Baerg of the University of Arkansas. Many participants took time out to attend the annual Ozark Arts and Crafts Fair at War Eagle.

Hot Springs was the site of the 22nd SFIWC, held at the Arlington Hotel on August 16-18, 1977. Jack Coster (Stephen F. Austin State University) was Chairman, while Fred Hain (North Carolina State University) was Secretary-Treasurer. Counselors were H. J. “Jack” Heikkenen (VPISU), James A. Copony (VA Division of Forestry), and John C. Nord (US Forest Service). Wayne Berisford (University of Georgia) served as Program Chair. Attendance totaled 128, the best record to that date. D. A. Crosley (University of Georgia) gave the keynote address entitled “Regulations of forest ecosystems by insects.” Concurrent workshops focused on chemical control of bark beetles, data base management systems, seed and cone insects, teaching forest entomology, shade tree insects, and forest disease research. Jack Heikkenen led a special interest group meeting to promote his hypothesis that the southern pine beetle is simply a forest scavenger, attacking dying trees.

Roy Hedden led a field trip to view Weyerhaeuser’s high yield forestry program. Michael J. Haverty (US Forest Service) was the recipient of the Outstanding Contribution Award (predecessor of the A. D. Hopkins Award) for his publication “You Can Protect Your Home From Termites.” Newly-elected chairman Gerry Hertel (US Forest Service) also was honored with the 1977 Ethical Practices Award for reasons lost to history. The SFIWC Slide Committee announced that the 35mm insect slide series, first offered in 1970, had been expanded to 244 slides and was being made available for sale at a cost of $97.60. In the final business meeting, Chairman Coster created the position of SFIWC Historian and named Harry O. Yates III (US Forest Service) to this position. Yates served as historian with dedication for twenty years until transferring the responsibilities in 1996 to Ron Billings (Texas Forest Service). Sadly, Harry passed away on April 8, 2015 at the age of 83.

In 1990, the SFIWC returned to Fayetteville for the 35th conference, held at the Hilton Hotel on July 30-August 2. Peter Lorio (US Forest Service) was Chairman that year, Alex Mangini (U. S. Forest Service) was Secretary/Treasurer, and counselors were Robert Bridges (U. S. Forest Service, Bruce Kauffman (Tennessee) and Gerald Nordin (University of Kentucky). A few of the 63 members who attended this meeting still have the green, zippered brief case with the SFIWC.
logo given at registration. Workshops covered a variety of topics, including natural and man-caused disasters, forestry practices and the public, future of forest pesticides, bark beetle biology and control, regeneration insects, and hardwood insects. Fred Stephen (U. of Arkansas), the 1989 recipient of the A. D. Hopkins Award, gave a talk entitled “A Hitchhiker’s Guide to the Southern Pine Beetle.” For the first time, the Hopkin’s talk was included in the Proceedings. Gary DeBarr (US Forest Service) was selected as the 1990 winner of the A. D. Hopkins Award. At the final business meeting, Historian Harry Yates noted that 1990 marked the 100-year anniversary of A. D. Hopkins’ first day on the job (March 1, 1890) and encouraged all forest entomologists to celebrate March 1 of each year as “A. D. Hopkins Day.”

It would be 25 years before the SFIWC would return to Arkansas.

Respectfully submitted,

Ronald F. Billings
Historian
Common Names Committee Report

There were no common name applications submitted to the Committee since our last meeting in 2014 at Charleston, SC. The Committee is always happy to answer any questions concerning common name submissions and procedures. If anyone has a potential common name for a Southern forest insect or mite, please feel free to contact the Chairman, Alex Mangini, at the address below.

Alex Mangini, PhD
Entomologist
USDA Forest Service
Forest Health Protection
2500 Shreveport Highway
Pineville, LA 71360
318-473-7296 office
318-613-4395 cell
amangini@fs.fed.us

Respectfully submitted to SFIWC members on 22 July 2015.

/s/ Alex Mangini
Chair, SFIWC Common Names Committee
Photo Salon Awards
2015 SFIWC – Fayetteville, Arkansas
Ronald Billings, Organizer

Forest Insects
1st Place  Joe Pase – Emerald flower scarab
2nd Place  You Li – Male ambrosia beetle about to fly
3rd Place  You Li – Ambrosia beetle adult and eggs
Hon. Men.  Ron Billings – Lantern bugs in Honduras

Forest Insect Damage
1st Place  Ryan Blaedow – EAB galleries on tree to be removed
2nd Place  Ron Billings – SPB Outbreak in Honduras
3rd Place  Ron Billings – Salvage of SPB in Honduras
Hon. Men.  Ron Billings – Mass attack of *D. mesoamericanus*

Series
1st Place  Joe, Nancy Pase – Red-spotted purple butterfly
2nd Place  Ron Billings – East Texas Forest Entomology Seminar
3rd Place  Ron Billings, USFS – Tribute to Dr. John Moser

Other
1st Place  Joe Pase – Jumping spider
2nd Place  Ron Billings – Shelf fungi conks
3rd Place  Ron Billings – Sporaphores of *Trametes versicolor*
Hon. Men.  Ron Billings – Sapsucker convention site

Entomologists at Work
1st Place  Wood Johnson – Alex Mangini in bucket truck
2nd Place  Lori Chamberlin – Bucket truckin’
3rd Place  Ron Billings – Fred Stephen and red oak borer
3rd Place (tie)  Ron Billings – Forrest Oliveria and soapberry borer
Hon. Men.  Ron Billings – Joe donates insect collection
Hon. Men. (tie)  Ron Billings – Bill Upton counts clerids

Humor
1st Place  Paulo Ortiz (Guatemala) – Primary attraction (Clarke)
2nd Place  Ron Billings – N. Forest Dump Station
3rd Place  Ron Billings – Billings sits in for Pres. Bush
Hon. Men.  Stacy Blomquist – Jim Meeker at work

Judges: Elizabeth Benton, John Formby, and Don Grosman
Officers and Committees – 2014-2015

Officers

CHAIR – 2014-2017
Kier Klepzig, USDA Forest Service SRS, 200 W T Weaver Blvd., Asheville NC 28804-3454. 828-257-4307, Fax 828-257-4313. Email kklepzig@fs.fed.us

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COUNSELOR – 2013-2017
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GRADUATE STUDENT SESSION 2013-2017
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57th Conference, July 21-24, 2015
Fayetteville, Arkansas

LOCAL ARRANGEMENTS
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PROGRAM
Bob Coulson, Texas A&M University, Dept. of Entomology, College Station TX 77843-2475. 979-845-9725, Fax 979-862-4820. Email r-coulson@tamu.edu
John Riggins, Mississippi State University, Dept. of Entomology and Plant Pathology, 158 Clay Lyle, Mississippi State MS 39762. 662-325-2984, Fax 662-325-8837. Email jriggins@entomology.msstate.edu

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FRUSTRANA CUP TOURNAMENT
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