Proceedings

61st Southern Forest Insect Work Conference

Photo by Katlin DeWitt, Virginia Department of Forestry

June 21 – 23, 2022

Lexington Marriott City Center

Lexington, Kentucky

PROCEEDINGS

61st Annual

SOUTHERN FOREST INSECT WORK CONFERENCE

Lexington Marriott City Center

Lexington, Kentucky

21–23 June 2022

Molly Darr and Katlin DeWitt, Program Chairs

Lynne Rieske-Kinney, Alexandra Blevins, Beth Kyre, and Flávia Pampolini, Local Arrangements

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Registration List, 61st SFIWC, Lexington, Kentucky

* = student, † = retired, # = remote

Olivia Andrews*
Chris Asaro
Matthew P Ayres
Chandler Barton
Meredith Bean*
David Bechtel
Nicholas Benedetto*
Alexandra Blevins
Ryan Bohannon*
Zachary Bragg*
Emma Briggs*
Rebecca Butler*
Lori Chamberlin
Kevin Chase
Stephen R Clarke†
Natalie Clay
Tyler Cloud
Chris Cooper
Robert N Coulson
Anthony W Courter
Ellen Crocker
Katy Crout
Katlin DeWitt
Nicholas Dietschler*
Neil (Royce) Dingley*
Joseph J Doccola
Tyler Dreaden
Madison Eaton
Christine Favorito*
Kamal J K Gandhi
Demian Gomez
Jerome F Grant
Ignazio Graziosi
Mitchell Green*
Donald M Grosman
Shane Harrington
Jessica Hartshorn
Brian Heath
Garron Hicks
Ashleigh Hillen*
Hannah Hollowell
Aryanna James
David Jenkins
Robert Jetton
Todd Johnson
Kier D Klepzig
Morgan Knutsen*
David L Kulhavy
Bethany Kyre*
F Wayne Langston
Gabe LeMay*
Matthew Longmire*
Marina Lupu*
Dominic Manz*
Bud Mayfield
Kristy McAndrew*
Elizabeth McCarty
Steve McNulty#
Scott Merkle#
Paul Merten
Jim Moeller
Holly Munro
Charles (Dana) Nelson#
Abraham Nielsen
Rabiu Olatinwo
Katie O'Shields*
Kelly Oten
James Forest Palmer
Flávia Pampolini*
Kristin Peters*
Carrie Preston*
Robert Progar
Robert Rabaglia
Abigail Ratcliff*
Austin Reese
Lynne K Rieske-Kinney
John J Riggins
Dieter Rudolph
Scott M Salom
Lena Schmitt*
Ashley Schulz
Thomas Sheehan
William P Shepherd
Timothy Shively*
Patrick Simons
James Slye
Courtney Smith*
Lawrence Allen Smith
Jeffrey Stringer
Brian T Sullivan
Damilola Taiwo*
Austin Thomas
John Thomason*
Robert Trickel†
Kendra Wagner*
Marcia Wakarchuk Jones
Mary Wallace*
Samuel Ward
Lynne Womack
Erika Wright*

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32 students, 2 retirees, and 66 professional members = 100 registered participants

SFIWC 2022 Group Pictures

Figure 1
Front Row (left to right): Kendra Wagner, Chandler Barton, Natalie Clay, Jim Slye, Jess Hartshorn, Shane Harrington
Back Row (left to right): Kelly Oten, Robert Trickel, Nicholas Benedetto, John Thomason, John Riggins, David Jenkins

Figure 2
Front Row (left to right): Kristy McAndrew, Mitchell Green, Emma Briggs, Christine Favorito, Katie O'Shields, David Kulhavy
Back Row (left to right): Todd Johnson, Bob Coulson, Kier Klepzig, Royce Dingley, Damilola Taiwo, Demian Gomez, Matt Ayres

Figure 3
Front Row (left to right): Kamal Gandhi, Holly Munro, Alexandra Blevins, Chris Cooper, Brian Heath, Wayne Langston
Back Row (left to right): Will Shepherd, Bob Rabaglia, Don Grosman, Jim Moeller, Brian Sullivan, Gabe LeMay

Figure 4
Front Row (left to right): Katlin DeWitt, Beth Kyre, Morgan Knutsen, Courtney Smith, Austin Thomas, Patrick Simons
Back Row (left to right): Paul Merten, Chris Asaro, Flávia Pampolini, Tyler Cloud, Mary Wallace, Dominic Manz

Figure 5
Front Row (left to right): Abby Ratcliff, Lena Schmitt, Kristin Peters, Marina Lupu, Meredith Bean, Katy Crout
Back Row (left to right): Carrie Preston, Ashleigh Hillen, Zach Bragg, Lynne Rieske-Kinney, Hannah Hollowell, Ashley Schulz

Figure 6
Front Row (left to right): Scott Salom, Aryanna James, Rabiu Olatinwo, David Bechtel, Rob Progar, Rebecca Butler
Back Row (left to right): Jerome Grant, Olivia Andrews, Tim Shively, James Palmer, Matthew Longmire, Ryan Bohannon

Figure 7
Front Row (left to right): Erika Wright, Bud Mayfield, Robert Jetton, Abe Nielsen, Ignazio Graziosi, Kevin Chase
Back Row (left to right): Tyler Dreaden, Sam Ward, Demian Gomez

Figure 8
(left to right): Tom Sheehan, Lori Chamberlin, Elizabeth McCarty, Marcia Wakarchuk Jones, Nicholas Dietschler

Attendees not pictured: Steve Clarke, Tony Courter, Ellen Crocker, Joe Doccola, Madison Eaton, Garron Hicks, Steve McNulty, Scott Merkle, Dana Nelson, Austin Reese, Dieter Rudolph, Allen Smith, Jeff Stringer, Lynne Womack

61st Annual Southern Forest Insect Work Conference
June 21 – 23, 2022
Lexington, KY
Program

Tuesday, June 21st

Breakfast on your own

8:00 **Meeting Registration – Ballroom Prefunction**
Organizer: *Will Shepherd, USDA-FS-SRS*

8:00 – 10:00 **Southern Pine Beetle Working Group – Ballroom AB**
Organizers: *Chris Asaro and Brian Sullivan, USDA-FS-FHP*

- Welcome, Quick overview of SPB activity across the region over the last 3 years, SPB Prevention Program Updates
  Chris Asaro
- Updates on SPB all-in-one website
  David Coyle
- Update on SPB Hazard Mapping
  Chris Asaro for Frank Krist
- A review of specific SPB hotspots in Eastern Zone of R8 – Oconee, Southern Apps, Francis Marion
  Paul Merten
- Revisit hypotheses for why SPB has been absent in Texas and adjacent states
  Brian Sullivan (and others)
- A review, update of SPB pheromone research and developments
  Brian Sullivan
- Quick update on SPB Spring Trapping, Survey 1,2,3
  Matt Ayers and Carissa Aoki for Michael Torbett
- A review and discussion of SPB Spring Model prediction success
  Matt Ayers and Carissa Aoki

9:00 – 10:00 **Roger F. Anderson Award Committee – Ballroom DE**
Organizer: *Scott Salom, Virginia Tech*

10:15 – 11:30 **Forest Health Committee (Closed Meeting) – Ballroom AB**
Organizer: *Dieter Rudolph, Oklahoma Forestry Services*

11:30 – 12:00 **Executive Team Meeting – Ballroom DE**
Organizer: *Lynne K. Rieske-Kinney, University of Kentucky*

12:00 – 1:00 **Lunch on your own**

1:00 – 1:15 **Welcome Address – Ballroom C**
Presenter: *Brandon Howard, State Forester, Kentucky Division of Forestry*

1:15 – 2:00 **Opening Business Meeting – Ballroom C**
Organizer: *Lynne K. Rieske-Kinney, University of Kentucky*

2:00 – 2:45 **Keynote Address – Ballroom C**
Developing Solutions for A Changing Environment. *Jeff Stringer, Chair, Department of Forestry and Natural Resources, University of Kentucky*

2:45 – 3:30 **Plenary Session – Ballroom C**
Advances in short-term and long-term forest insect outbreak forecasting. *Dr. Steve McNulty, US Forest Service - Eastern Forest Environmental Threat Assessment Center*

3:30 – 4:15 **BREAK / GROUP PHOTOS**

4:15 – 5:00 **AD Hopkins Presentation – Ballroom C**
A Forest Entomologist Off the Record. *Steve Clarke, retired*

5:00 – 5:30 **Future of SFIWC Discussion – Ballroom C**
Organizer: *Scott Salom, Virginia Tech*

5:30 – 6:00 **A.D. Hopkins Award Committee – Ballroom C**
Organizer: *Lynne K. Rieske-Kinney, University of Kentucky*

6:00 – 8:00 **Poster Set-up – Ballroom Prefunction**
Organizer*: Jess Hartshorn, Clemson University*

6:00 – 8:00 **Mixer and Reception – Ballroom Prefunction**

8:00 – 11:00 **Insect Light Sheeting – UK Arboretum**
Organizer: *Tom Sheehan, Jones Center at Ichauway*

Wednesday, June 22nd

Breakfast on your own

8:00 – 12:00 Meeting Registration – Ballroom Prefunction
Organizer: *Will Shepherd, USDA-FS-SRS*

8:30 – 10:00 Graduate Student Session – Ballroom C
Organizers: *Elizabeth McCarty, University of Georgia; Ryan Bohannon, North Carolina State University; Carrie Preston, Virginia Tech*

- Invasion patterns of Siricidae species intercepted at North American ports
  Kendra Wagner[1], Samuel F. Ward[1], Andrew M. Liebhold[2], Eckehard G. Brockerhoff[3], Rebecca Turner[4], and John J. Riggins[1]
  [1]Mississippi State University, [2]USDA Forest Service Northern Research Station, [3]Swiss Federal Institute for Forest, Snow and Landscape Research WSL, [4]Scion, New Zealand Forest Research Institute

- Warm temperatures slow, but do not stop, the growth of *Verticillium nonalfalfae*, a native fungal pathogen used for the biological control of *Ailanthus altissima*
  Timothy J. Shively, Brian R. Smith, Jacob N. Barney, Scott N. Salom, and Antonius B. Baudoin
  Virginia Polytechnic Institute and State University

  [**Abstract:** The native vascular wilt fungus, *Verticillium nonalfalfae*, is a safe, effective, and proven biological control agent for the invasive tree *Ailanthus altissima* (tree-of-heaven, or TOH). The strain of *V. nonalfalfae* isolated in Pennsylvania (Vn140) has been submitted to the US EPA for approval as a commercially available bioherbicide. However, little is known about how the fungus and its various isolates are affected by temperature, particularly heat. Pure cultures of both Vn140 and a strain isolated in Virginia (Vn200) were grown in the lab at a range of temperatures. The cultures' radial growth was measured daily after continuous exposure to temperatures from 14-30°C, and in additional trials, after brief pulses at temperatures from -2.5-10°C and 25-35°C. The ideal temperature range for fungal growth and sporulation was 17-23°C. No growth occurred at continuous exposure to temperatures above 28.5°C. Brief exposures at 29°C and higher also reduced growth, and at 35°C, fungal colonies stopped growing and did not resume for several days. These findings have obvious implications for the application of the bioherbicide, especially in warmer climates, during the summer months, and considering the ubiquitous but uncertain effects of climate change. Future work will examine the effect of temperature on fungal growth and pathogenicity in inoculated TOH seedlings. Field inoculations using Vn140 have also been conducted across the state of Virginia to provide evidence for practical application guidelines and to investigate what level of intervention is required for ecological succession of treated areas to native, desirable plant species.]

- Determining the minimum founding population size for establishment of crapemyrtle bark scale

  Erika R. Wright[1], Kevin D. Chase[2], and Samuel F. Ward[1]
  [1]Mississippi State University, [2]Bartlett Tree Research Laboratory

- Phenology of *Anoplophora glabripennis* in South Carolina

  Lena Schmitt[1], R. Talbot Trotter[2], Scott E. Pfister[3], and David R. Coyle[1]
  [1]Clemson University, [2]USDA Forest Service, [3]USDA APHIS

- Adventures in beetle busting: Alternative methods for the eradication of Asian longhorned beetle in South Carolina

  Abby Ratcliff[1], Kelly Oten[1], and David R. Coyle[2]
  [1]North Carolina State University, [2]Clemson University

  [**Abstract:** The Asian longhorned beetle (ALB; *Anoplophora glabripennis*) is a highly destructive and invasive beetle in the United States and the target of three distinct federal quarantines in the midwest and northeast. The newest quarantine zone was established in Hollywood, SC in 2020 after ALB was detected for the first time in the South. This infestation is unique from previous zones in that it contains coastal bottomland sites that cannot support the current practice of removing infested trees with heavy machinery. Here, three alternative approaches are being investigated to facilitate eradication without physically removing the woody host material from hard to access sites.]

- Optimizing biological control releases for emerald ash borer in North Carolina

  Ryan Bohannon, Courtney Smith, and Kelly Oten
  North Carolina State University

  [**Abstract:** The emerald ash borer (EAB; *Agrilus planipennis*) is an invasive beetle that has killed millions of ash (*Fraxinus* spp.) trees across North America. Individual trees can be protected using insecticides, but chemical control is not practical on large scales. Classical biological control using introductions of parasitoid wasps may provide a sustainable approach to managing EAB. However, establishment of parasitoids in the southern United States has been difficult. The phenology of EAB was studied in central North Carolina to inform biological control efforts that better align with the seasonal availability of susceptible EAB life stages in the warm climate of this region. Biweekly EAB life stage assessments and adult trapping were conducted in stands of EAB-infested green ash (*Fraxinus pennsylvanica* Marshall) over 26 consecutive months. Release and recovery efforts for the EAB parasitoid *Spathius agrili* were also conducted in these stands to assess parasitoid establishment. Based on these collections, EAB exhibits a univoltine (one-year) life cycle. Parasitoid-susceptible larvae (third and fourth instars in galleries) are present from late June through October (~1,100–3,000 degree days base 10ºC) and are mostly absent during the remainder of the year. Parasitoid release timings and the life history of selected parasitoid species should be aligned with this window of host availability to be effective. Recovery efforts did not detect the introduced parasitoid *S. agrili* but did recover potential native and naturalized EAB parasitoid species. These results will help improve the timing and effectiveness of EAB management efforts as this forest pest continues to spread in southern North America.]

- Ground truthing predictions: the search for baldcypress leafroller

  Kristy M. McAndrew and Samuel F. Ward
  Mississippi State University

  [**Abstract:** Forested coastal wetlands are economically important ecosystems that reduce damage from tropical storms by serving as wind buffers. Climate change is threatening some coastal forests through rises in sea-level and could also increase storm frequency and severity in the gulf coast. An emergent native pest, the baldcypress leafroller (*Archips goyerana* Kruse), has defoliated thousands of hectares of coastal Louisiana baldcypress (*Taxodium distichum* (L.) Rich.) since the 1980s. Defoliation has been driven by changes in regional hydrology, including saltwater intrusion, and is thus both a cause and symptom of the declining health of coastal forests. Despite the serious effects of this pest – such as reduced radial growth and tree morality - the extent of its native range remains unknown. Using occurrence data for baldcypress leafroller and baldcypress, we developed a species distribution model for the pest throughout the southeastern US. We then conducted pheromone baited trapping for baldcypress leafroller throughout the predicted suitable range obtained from our species distribution model. We hope that through better defining both the potential and actual range of this pest, forest managers can anticipate outbreaks and potentially use baldcypress leafroller as a bioindicator species for ecosystem health.]

10:00 – 10:30 BREAK

10:30 – 12:00 Graduate Student Session cont'd – Ballroom C

- Aestivation studies and the effect of imidacloprid on the subterranean life cycle of *Laricobius* spp., biological control agents for the hemlock woolly adelgid

  Ashleigh P. Hillen[1], Aaron D. Gross[1], Sheldon S. Hilaire[1], Albert E. Mayfield III[2], Jeremiah R. Foley IV[3], Mary K. Salcedo[1], Jake J. Socha[1], Kang Xia[1], and Scott M. Salom[1]
  [1]Virginia Polytechnic Institute and State University, [2]USDA Forest Service Southern Research Station, [3]USDA-ARS Invasive Plant Research Laboratory

  [**Abstract:** The hemlock woolly adelgid (HWA) *Adelges tsugae* (Annand) (Hemiptera: Adelgidae) was first documented in the eastern United States in 1951 in Richmond, Virginia and has since spread throughout most of the range of eastern hemlocks, *Tsuga canandensis* (L.) and the entire range of Carolina hemlocks, *Tsuga caroliniana* (Engelman). HWA managers are encouraged to use integrated pest management (IPM), combining chemical, silvicultural, and biological control tactics to create a more sustainable and effective approach for managing HWA. *Laricobius* spp. (Coleoptera: Derodontidae) has been used as a biological control agent of HWA since 2003, occupying a subterranean and arboreal life phase synchronous with HWA. Within an IPM context, there is a potential for beetles to land on insecticide-treated trees and settle below the tree's drip line for the subterranean portion of its lifecycle. Imidacloprid is the most widely used insecticide for HWA management and can persist in the soil for up to 12 months post-application, along with metabolites, negatively impacting soil microarthropods. During the subterranean portion of their

lifecycle, *Laricobius* adults are assumed to be undergoing aestivational diapause, a crucial developmental stage triggered by hormones and seasonal changes to stop growth until conditions are suitable. However, there is limited knowledge on the subterranean portion of *Laricobius* spp. life cycle, and furthermore how imidacloprid and its metabolites impact this development stage. Therefore, the impact of imidacloprid on the subterranean life phase of *Laricobius* spp. was investigated in the field by quantifying imidacloprid and metabolite soil concentrations and correlating that to percent emergence. In addition, lab studies identified the chronic effects of those chemical concentrations and documented *Laricobius* spp. burrowing depth using 3D X-Ray Microscopy to further investigate this interaction.]

- Is hemlock growth and physiology affected by *Laricobius nigrinus* predation on hemlock woolly adelgid?

Carrie Preston, Scott Salom, and John Seiler
Virginia Polytechnic Institute and State University

[**Abstract:** The hemlock woolly adelgid (HWA), *Adelges tsugae*, an invasive species in the eastern United States and in Canada, is gravely impacting forest ecosystems containing eastern hemlock, *Tsuga canadensis*. HWA feed on xylem ray parenchyma cells that can result in decreased photosynthetic rate, stomatal conductance, and lateral shoot growth, eventually leading to tree mortality. Biological control efforts have led to the successful establishment of the specialist predator *Laricobius nigrinus* throughout a substantial portion of the adelgid's current geographic range in the eastern US, following releases beginning in 2003. Predation by *L. nigrinus*, where it has established, has been shown to significantly reduce populations of HWA sistens generation. However, its effect on hemlock tree health is unknown. In Virginia, 14 eastern hemlock trees were selected at one field site. Three branches with HWA population densities greater than 1 HWA/cm were randomly assigned one of three treatments and a fourth branch with HWA populations less than 1 HWA/cm was assigned as the control. Fine mesh cages were applied to each branch to exclude *L. nigrinus* from feeding on HWA. Field caught *L. nigrinus* larvae were lab reared to adults and sexed based on the presence of their ability to oviposit. Once oviposition occurred, *L. nigrinus* adults were separated into two densities: 2 males + 2 females and 4 males + 4 females. Adults were then transported to the field site and released into treatment cages. For each branch, two 20 – 30 cm sections with similar HWA population densities were assessed at different times in the season. The first assessment took place in the spring and confirmed the presence of *L. nigrinus* larvae and reproductive success of released *L. nigrinus* adults, HWA sistens ovisac disturbance, and HWA sistens winter mortality. The second assessment took place in the summer and fall, where tree health measurements such as the net photosynthetic rate, stomatal conductance, and the production of lateral shoot growth were taken. These measures were carried out to determine if they were affected by reduced HWA densities from predation, and if so, to what extent.]

- How do stand-level characteristics affect native bee populations and communities in working forests?

Christine M. Favorito[1], James A. Martin[1], Angela L. Larsen-Gray[2], Daniel U. Greene[3], Christine Cairns Fortuin[1], Brittany F. Barnes[1], Elizabeth McCarty[1], and Kamal J.K. Gandhi[1]
[1]University of Georgia, [2]National Council for Air and Stream Improvement, Inc., [3]Weyerhaeuser Company

[**Abstract:** Insect pollinators provide billions of dollars in ecosystem services through crop and native plant pollination. Bees are recognized as the most efficient and effective insect pollinators because they use floral resources for their entire life cycle and possess specialized adaptations for pollination. Unfortunately, there is evidence that some bee groups are declining due to factors such as habitat degradation and climate change. Forests are common throughout the southeastern United States, and most of these forests are privately owned. Despite their prevalence, little research has focused on native bees within privately-owned working forests. Therefore, we evaluated aspects of forest structure and composition that best support bees within working forests in the Upper Coastal Plain region of Georgia. Our objectives were to compare native bee population and community metrics among various age classes of working forests and test effects of stand-level structure and composition on bee populations and communities. We sampled bees from May-September 2020-2021 in 32 loblolly pine (*Pinus taeda*) stands across four stages (early establishment, pre-thinned with a closing canopy, pre-thinned with a closed canopy, and post-thinned) using pan and blue vane traps. We also measured aspects of forest structure and composition (e.g., understory plants and woody debris). Generally, native bees were more abundant in early establishment stands, and there was a higher species richness in early establishment and post-thinned stands. Measured aspects of forest structure explained 57% of the variance in bee species composition. Percent canopy openness, percent cover of minimally decayed woody debris, percent understory plants flowering, litter depth, and number of snags were the most important variables driving bee community composition. We are currently analyzing effects of understory plant species composition on native bee abundance and diversity. Results from this study will inform forest managers of beneficial practices for these crucial pollinators.]

- The spicebush sickness: Impact of laurel wilt on insect diversity and community composition of northern Spicebush

Matthew Longmire[1], Jerome Grant[1], Mark Windham[1], Alan Windham[1], Albert Mayfield[2], and Qiusheng Wu[1]
[1]University of Tennessee, [2]USDA Forest Service

[**Abstract:** Laurel wilt, a fungal disease caused by an invasive pathogen, *Harringtonia lauricola* sp. nov., has devastated populations of several plants in the family Lauraceae in the southeastern U.S. In 2019, laurel wilt was found in Tennessee on *Sassafras albidum* (Nutt.) Nees (sassafras). This pathogen is known to be transmitted by *Xyleborus glabratus* Eichhoff (redbay ambrosia beetle). Laurel wilt has recently been observed on *Lindera benzoin* (L.) Blume (northern spicebush). Spicebush is endemic to the eastern U.S. and has a deep cultural significance and rich history in traditional practices by Native

Americans and Appalachian region residents. Spicebush is also important from an ecological standpoint. Some species, such as larvae of *Papilio troilus* L. (spicebush swallowtails), are known to feed almost exclusively on spicebush or sassafras. Other arthropods may also exhibit a specialized dependence on spicebush. However, the insect diversity and community composition for spicebush is poorly known. Because no treatment to cure laurel wilt or protect plants from infection is currently available, it has the potential to spread through most of the native range of spicebush. If spicebush becomes locally or regionally extinct due to laurel wilt, it is critical to have a basic knowledge of associated insects to gauge which species may become threatened, endangered, or even locally or regionally extinct. Therefore, a multi-year study designed to determine insect diversity and community composition on spicebush was initiated in Tennessee. A relatively small variety of insects were collected from spicebush so far. However, the majority of insects collected were determined to be specialists or semi-specialists of spicebush. While some species did not directly feed on spicebush, they were dependent on spicebush for shelter. These observations suggest that, while the total number of insect species impacted by spicebush mortality might not be large, the majority of these affected species are almost totally dependent on spicebush in some way. If laurel wilt continues to spread through populations of spicebush, several native insect species will likely become locally or regionally extinct. This research will inform protection of spicebush and associated insects in natural areas.]

- Gene silencing: a potential management tool for the redbay ambrosia beetle
  Morgan Knutsen and Lynne K. Rieske
  University of Kentucky

- Gene silencing induces mortality in *Ips calligraphus*: potential for a novel management tool
  Mary Wallace and Lynne K. Rieske
  [1]University of Kentucky

- Dissemination and Response to Pest-Specific Triggers of Gene Silencing in Loblolly Pine
  Zachary A. Bragg and Lynne K. Rieske
  University of Kentucky

  [**Abstract:** Due to a combination of climate change, invasive species, and other natural and anthropogenic stresses forests are experiencing heightened levels of stress leading to cascading ecosystem effects and complicating insect pest management. While traditional management techniques can be successful, they cannot keep pace with current insect activity, therefore novel technologies that are able to augment forest management are needed. RNA-interference (RNAi) is a biological process that plays a crucial role in eukaryotic viral defense, but when induced with specific double-stranded RNAs (dsRNA), can lead to reduced gene expression and subsequent mortality. Laboratory assays have shown that dsRNAs can induce gene silencing in a variety of forests pests including both mountain and southern pine beetle (*Dendroctonus ponderosae* and *D. frontalis).* While the first RNAi biopesticides for agricultural pests will soon reach the market, their research and eventual deployment in forest settings is lagging. To bridge this gap, we investigated the translocation and persistence of exogenous dsRNAs applied as a root soak to loblolly pine (*Pinus taeda*) and evaluated

differences in gene expression between treated and untreated seedlings. Bareroot loblolly seedlings (N = 90) were exposed to dsRNAs as a root soak and then sectioned into different tissue types (roots, stems, crown, needle, and meristem). Sanger sequencing and gel visualization confirmed the presence of exogenously applied dsRNAs in each of the five tissue types after 1, 3, 5, and 7 days of exposure. Additionally, seedlings were evaluated for gene expression changes in response to exogenous, pest-specific dsRNA. Total RNA from both treated and untreated (N = 6) seedlings was sequenced (NovaSeq PE150) and raw reads (~144 M reads/sample) were processed and assembled using a genome-guided transcriptome assembly program. Following transcript quantification, analysis revealed more than 800 differentially expressed genes between control and treated seedlings, with the greatest abundance of transcripts being involved with replication and repair of nucleic acids. Plants possess their own RNAi machinery and as such understanding how host plants may respond to non-host targeted RNAi biopesticides may play a crucial role in fine-tuning host delivered dsRNAs for forests pests.]

12:00 – **Lunch on your own**

12:30 – **Field Trip - Distillery District**
Organizer: Lynne K. Rieske-Kinney

1:30 – **Frustrana Cup – Ethereal Brewing (Distillery District)**
Organizer: Beth Kyre

6:00 – 8:00 **Poster Session – Ballroom Prefunction**
Organizer: Jess Hartshorn, Clemson University

Thursday, June 23rd

Breakfast on your own

8:30 – 10:00 Concurrent Session 1

While You Were Quarantining: New Developments in Hemlock Woolly Adelgid Research and Management During the COVID 19 Pandemic – Ballroom AB

Moderators: *Robert Jetton, NC State University; and Bud Mayfield USDA-FS-SRS*

- Hemlock conservation: insecticide movement in the environment and native insect risks.

  Elizabeth McCarty, University of Georgia

  [**Abstract:** Imidacloprid treatments for eastern hemlock (*Tsuga canadensis* (L.) Carriere [Pinaceae]) benefit forests by conserving hemlocks but have the potential to negatively affect other aspects of forest systems. The risks to canopy arthropods, soil arthropods, and aquatic macroinvertebrates have been studied and current knowledge indicates that non-target risks are low. However, the risks to seed dispersing ants and pollinators are not known. These insect associates of the endangered persistent trillium (*Trillium persistens* Duncan [Liliaceae]) are of particular concern, because the six persistent trillium populations are located in hemlock forests.

  Insecticide risk in the first 3.5 years after hemlock treatments was assessed to determine which of three application methods would be most protective to insect associates over time. Non-target imidacloprid movement from three application methods (basal bark spray, soil injections, and soil drench) was tested in soil and flowers to better understand non-target risk in environment. Insecticide concentrations in the environment can provide guidance on the presence and degree of risk in hemlock forest systems. Ant populations were also assessed by collecting leaf litter near the base of imidacloprid-treated hemlock trees.

  Soil and floral imidacloprid concentrations were highest three weeks post-application. Soil imidacloprid concentrations decreased over time and decreased significantly three years post-application. Floral imidacloprid concentrations decreased significantly and were at concentrations of low risk to pollinators one year post-application. Floral imidacloprid concentrations did not vary among application methods. Soil imidacloprid concentrations were similar among basal bark spray and soil applications for most of the study duration. Ant species richness and abundance were not affected by imidacloprid use at the sites. Results from this research will assist land managers in determining best practices to be protective of sensitive forest ecosystems.]

- Redistribution of *Laricobius* beetles from western and eastern collections.

  Scott Salom, Virginia Tech

- *Leucotaraxis*: The future of HWA biological control?

  Nicholas Dietschler, Cornell University

  [**Abstract:** Management programs for the invasive hemlock woolly adelgid (HWA; *Adelges tsugae* Annand (Hemiptera: Adelgidae) have encompassed many

strategies, with emphasis on classical biological control for long term landscape level management. To date, multiple specialist predators have been researched as potential agents for biological control, with *Laricobius nigrinus* Fender (Coleoptera: Derodontidae) exhibiting the most success in the eastern US. Even though *La. nigrinus* can establish and reduce densities of the overwintering generation, HWA populations rebound due to lack of predation on the spring-summer generation. *Leucotaraxis argenticollis* and *Le. piniperda* are sympatric specialist predators co-occurring with *La. nigrinus,* showing promise to fill the predation gap. Recent observation of predator emergence dynamics in the native western range has increased release and collection efficacy. The consistent and predictable emergence of predators from western collections enables targeted collection and subsequent single-species releases during suitable HWA developmental stages in the invaded eastern range. These emergence patterns also help to inform targeted survey windows in the eastern US to evaluate for the establishment of predators. Research utilizing lab-reared puparia has confirmed that *Le. argenticollis* overwinters inside the puparium and is able to survive winter throughout the eastern range of eastern hemlock. Preliminary analyses of predator development data in addition to field studies suggest warm summer temperatures may increase puparial mortality. These projects provide the first insights into the potential for predator establishment, variation in survival, and diapause throughout the eastern US. Combined evidence from field and laboratory studies has spurred efforts to survey for established populations of *Leucotaraxis* spp. using a multi-pronged establishment survey protocol. Post release survey of *Leucotaraxis* has proved challenging due to their arboreal life history, leading to the development of novel survey tools. Development of environmental DNA detection techniques for both species of *Leucotaraxis* and HWA is showing promise for directing predator establishment and dispersal surveys and locating new infestations of the pest. Collaborative creation and testing of the "Lari-Leuco" container, a survey device for collection of ascending and descending organisms, provides an effective tool for laboratory observation of field-collected infested hemlock foliage. Yellow sticky prism traps have proven effective during field trials in British Columbia and are being deployed in the east to increase the time span of monitoring. Research and release efforts with *Leucotaraxis* are beginning to show promise that they may fill crucial predation gaps and lead to effective HWA management in the eastern US.]

- Effect of silvicultural canopy gaps on hemlock woolly adelgid density and eastern hemlock health in the southern Appalachian Mountains.
  Bud Mayfield III, USDA Forest Service Southern Research Station

- Evaluating silvicultural strategies for the reintroduction of eastern hemlock in the southern Appalachian Mountains.
  Robert Jetton, North Carolina State University

Engineer of odor highways and roadblocks: A session in memory of chemical ecologist David Wakarchuck – Ballroom DE

Moderators: *Brian Sullivan, US Forest Service and Kamal Gandhi, University of Georgia*

- Field response of black turpentine beetle to pine resin oxidation and pheromone displacement.

  Gabriel A. LeMay[1], Thomas O'Loughlin[2], David Wakarchuk[2], & Jiri Hulcr[1].

  [1]School of Forest, Fisheries and Geomatics Sciences, University of Florida, Gainesville, Florida, [2]Synergy Semiochemicals Corp., Delta, British Columbia, Canada

- Factors influencing responses of southern pine beetle to host odor 4-allylanisole in funnel traps.

  Sara K. O'Shields[1], Brian T. Sullivan[2], John Nowak[3], Holly L. Munro[1], Brittany F. Barnes[1], and Kamal J.K. Gandhi[1].

  [1]Warnell School of Forestry and Natural Resources, University of Georgia, Athens, Georgia. [2]USDA Forest Service, Southern Research Station, Pineville, Louisiana, [3]USDA Forest Service, Forest Health Protection, Asheville, North Carolina.

  [**Abstract:** Southern pine beetle, *Dendroctonus frontalis* Zimmerman (SPB) is a native bark beetle and a significant pine (*Pinus* spp.) pest in the eastern United States. SPB populations typically persist at endemic or latent levels. However, their populations also undergo an epidemic or outbreak phase when they utilize complex chemical signaling to initiate mass attacks and overwhelm host tree defenses. Attacked host trees release volatiles that can enhance or inhibit SPB's response to its aggregation pheromone. The host volatile 4-allylanisole (4 AA) was observed by past researchers to inhibit SPB aggregation but has recently been reported to greatly enhance SPB trap catches when paired with commercial lures. The reason for the differing responses reported in recent and earlier research is not fully understood. Hence, we investigated how procedural differences among studies, including trap-type used, positioning of release devices, and presence of other semiochemicals (i.e., isomers of the SPB pheromone brevicomin and specific host odor compounds), may affect SPB's responses to 4 AA. Preliminary results indicated that 4 AA increased SPB trap catches only when released with *endo*-brevicomin. Interactions between the effects of 4-allylanisole presence and other variables, including trap type and isomer of brevicomin, were important factors affecting SPB responses to 4 AA. 4-allylanisole may have the potential to improve detection of SPB and could enhance monitoring in the newly-invaded, northern reaches of its range where it may be difficult to detect.]

- Dave Wakarchuk: a legacy of contributions to forest entomology in North America.

  Brian T. Sullivan[1] and Kamal J.K. Gandhi[2]

  [1]Warnell School of Forestry and Natural Resources, University of Georgia, Athens, Georgia, [2]USDA Forest Service, Southern Research Station, Pineville, Louisiana.

Bark and Woodborers – Ballroom C

Moderator**:** *Sam Ward, Mississippi State University and Jess Hartshorn, Clemson University*

- Spatial and temporal trends of *Ips* beetle outbreaks in the southeastern U.S.
  Cristian Montes[1], Chris Asaro[2], Kier Klepzig[3], Elizabeth McCarthy[1], John Nowak[2], Caterina Villari[1], and Kamal Gandhi[1]
  University of Georgia[1], and USDA-FSFHP[2], Jones Center at Ichauway[3]

- Progress towards sustainable management of emerald ash borer in North Carolina
  Kelly Oten[1], Ryan Bohannon[1], Jon Kressuk[1], and Courtney Smith[1]
  [1]North Carolina State University

- Wicked woodborers: A closer look at the introduced insects that pose the biggest threat to North American hardwoods
  Ashley N. Schulz[1], Nathan P. Havill[2], Angela M. Hoover[3], Matthew P. Ayres[4], Kamal J.K. Gandhi[5], Daniel A. Herms[6], Ruth A. Hufbauer[7], Andrew M. Liebhold[2], Travis D. Marsico[8], Kenneth F. Raffa[9], Kathryn A. Thomas[3], Patrick C. Tobin[10], Daniel R. Uden[11], and Angela M. Mech[12]
  Mississippi State University[1], USDA Forest Service[2], United States Geological Survey Southwest Biological Science Center[3], Dartmouth College[4], University of Georgia[5], The Davey Tree Expert Company[6], Colorado State University[7], Arkansas State University[8], University of Wisconsin[9], University of Washington[10], University of Nebraska-Lincoln[11], University of Maine[12]

- Response of *Ips* communities to prescribed fire in South Carolina.
  Jess Hartshorn[1], Grace Nuttle[1], J. Forest Palmer[1], David R. Coyle[1], and John Nowak[2]
  Forestry and Environmental Conservation, Clemson University[1], USDA Forest Service, Southern Research Station[2]

- Definitely not boring: the Asian longhorned beetle situation in South Carolina
  David R. Coyle[1], Meredith Bean[1], Lena Schmitt[1], Marina Lupu[1], Katy Crout[1] Robert Ritger[1], R. Talbot Trotter[2], Abby Ratcliff[3], Kelly Oten[3], and Scott Pfister[4].
  Clemson University[1], USDA-FS-NRS[2], NC State University[3], and USDA-APHIS-S&T[4]

10:00 – 10:30 Break – Ballroom Prefunction

10:30 – 12:00 Concurrent Session 2

State Cooperators Session – Ballroom AB

Moderators: *David Coyle, Clemson University; and Kelly Oten, NC State University*

- Facing the December 2021 tornado outbreak: KDF's response
  Alexandra Blevins, Kentucky Division of Forestry

- Aerial surveys and ground truth plots to monitor ghost forests in NC
  Jim Moeller and Wayne Langston, North Carolina Forest Service

- Mississippi SPB Prevention Thinning Program
  Garron Hicks, Mississippi Forestry Commission

- Successes of the HWA Strike Team
  Hannah Hollowell[1], Jacqueline Broeker[1], Heather Slayton[1], Nathan Hoover[1], Alexandra Blevins[2]
  [1]Tennessee Division of Forestry, [2]Kentucky Division of Forestry

Tomorrow's Forest Pest Management – Ballroom DE

Moderators: *Beth Kyre & Flávia Pampolini, University of Kentucky*

- Opening statement
  Lynne K. Rieske, University of Kentucky, Dept. of Entomology.

- Re-framing the classical IPM approach for urban and forest tree pest management
  Kevin Chase, Entomologist, Bartlett Tree Experts

  [**Abstract:** The concept of integrated pest management (IPM) was developed for agricultural use. In most agricultural systems, annual crops are planted and harvested in the same year, allowing growers to modify their IPM approach year-to-year based on observed pests and environmental conditions. In natural, plantation, and urban forests, this is not the case because trees persist for decades. Also, most landowners do not depend on management practitioners until a problem exists, therefore forcing initial actions to be taken (e.g., pesticide use) outside of foundational IPM tactics (e.g., cultural and mechanical). In this presentation, I will discuss a re-framing scheme of the classical approach specific to urban and forest pests. Client expectations of either aesthetic appeal in ornamental landscapes or financial gains from long term tree crops are also considered.]

- Restoring the Rhizosphere to Mitigate Plant Stress in the Face of Climate Change
  Joseph J. Doccola, Director of Research & Development, Arborjet, Inc.

- RNAi based biopesticides as a potential approach for emerald ash borer management
  Flávia Pampolini and Lynne K. Rieske, University of Kentucky, Dept of Entomology

- Application of in vitro culture for collaborative research to conserve and restore threatened forest trees.

Scott Merkle[1], Ryan Tull[1], Mason Richins[1], Brittany Barnes[1], Jennifer Koch[2], David Carey[2], Lynne K. Rieske-Kinney[3], Flávia Pampolini[3], C. Dana Nelson[4], Ben Smith[5] and Kamal Gandhi[1]

[1]Warnell School of Forestry and Natural Resources, University of Georgia, Athens, GA; [2]USDA Forest Service, Northern Experiment Station, Delaware, OH, [3]Department of Entomology, University of Kentucky, Lexington, KY; [4]USDA Forest Service, Southern Research Station, Lexington, KY; [5]Department of Entomology and Plant Pathology, North Carolina State University, Raleigh, NC

[**Abstract:** The devastation of some of our most cherished North American forest trees due to attacks by exotic pests and pathogens make it critical that every available tool be employed for conservation and restoration of these species. The Merkle Lab specializes in using tissue culture to propagate southeastern US forest tree species in a highly collaborative framework. Our primary tool is an *in vitro* propagation approach known as somatic embryogenesis (SE), which produces clonal propagules called somatic embryos. These embryos, which resemble seed embryos, can be produced by the thousands and germinated to produce seedling-like plants call somatic seedlings. In combination with conventional breeding, genetic engineering and cryopreservation, SE can be a very powerful tool for conservation and restoration of threatened forest trees. As an example, we have collaborated with breeders at the Forest Restoration Alliance to conserve and restore eastern hemlock (*Tsuga canadensis*) and Carolina hemlock (*T. caroliniana*), by using SE to clonally propagate putatively hemlock woolly adelgid (*Adelges tsugae*; HWA)-resistant eastern hemlocks and hybrids between Carolina hemlock and HWA-resistant Asian hemlock species. More recently, in collaboration with scientists at The Ohio State University and the USDA Forest Service (USFS), Northern Research Station, we initiated embryogenic cultures from seeds collected from multiple "lingering" white ash (*Fraxinus americana*) and green ash (*F. pennsylvanica*) trees, which will facilitate clonal testing for emerald ash borer (*Agrilus planipennis*; EAB) resistance and, potentially, development of EAB-resistant ash varieties. We have optimized a cryopreservation protocol for the ash embryogenic cultures that will allow us to store the cultures while trees regenerated from the cultures are tested in the field. We have also applied our cryostorage protocol to embryogenic cultures of multiple rare North American ash species, including Texas ash (*F. albicans*) and Mexican ash (*F. berlandieriana*), to conserve germplasm of these species. Embryogenic ash cultures also make excellent target material for gene transfer. Working with scientists at the University of Kentucky and the USFS, Southern Research Station, we have genetically transformed green ash and white ash with marker genes in preparation for testing RNAi technology as a means of conferring EAB resistance to ash trees.]

- Symbiont vectored delivery of RNAi for protection against SPB
  Bethany Kyre and Lynne K. Rieske, University of Kentucky, Dept of Entomology

- Closing statement
  Charles (Dana) Nelson, Tree geneticist, co-director of Forest Health Research and Education Center, USFS

Open Session I – Ballroom C

Moderator: *Don Grosman, Arborjet*

- The critical roles of the Texas Corridor for Eastern Monarch Migration
  Robert Coulson and James Tracy, Knowledge Engineering Laboratory, Department of Entomology, Texas A&M University

- Protection of trees against spotted lanternfly using systemic insecticides
  Don Grosman[1], and Brian Walsh[2]
  [1]Arborjet, [2]Penn State Extension

- Eight years later: Key findings from a unique government – academia collaboration are shedding light on tick biology and ecology in the southeastern US
  JT Vogt[1], J Chandler[2], RA Butler[2], and RT Trout Fryxell[2].
  [1]USDA Forest Service, Athens, GA, [2]University of Tennessee, Knoxville, TN

- Finally, environmental variables CAN be used to describe and potentially identify sites where humans encounter ticks in the southeastern United States (U.S.)
  RA Butler[1], JT Vogt[2], D. Paulsen[1], J. Chandler[1], K. Randolph[2], and R. T. Trout Fryxell[1].
  [1]Department of Entomology and Plant Pathology, University of Tennessee [2]United States Department of Agriculture Forest Service, Southern Research Station

12:00 – 1:30 Lunch on your own

1:30 – 3:00 Concurrent Session 3

Sassy and Spicy: Laurel wilt in sassafras and northern spicebush in the Piedmont and Mountains – Ballroom DE

Moderator: *Bud Mayfield, USDA-FS-SRS*

- Spread, Vector Flight Behavior, and Impact of Laurel Wilt in Sassafras Beyond the Gulf-Atlantic Coastal Plain
  Albert E. Mayfield III[1], Rabiu O. Olatinwo[1], Jaesoon Hwang[2], Bryan T. Mudder[1], Alexandra Blevins[3], and Stephen W. Fraedrich.[1]
  [1]USDA Forest Service, Southern Research Station, [2]USDA Forest Service, Forest Health Protection, [3]Kentucky Division of Forestry

[**Abstract:** Laurel wilt is a destructive vascular disease of trees in the laurel family (Lauraceae) caused by a non-native insect/pathogen complex. This study monitored the recent spread and impact of laurel wilt in sassafras (*Sassafras albidum* (Nutt.) Nees) from the Gulf-Atlantic Coastal Plain region of the southeastern United States (US) into the adjacent Piedmont/Sandhills and Mountain regions. Laurel wilt was detected at 13 of 46 sassafras sites including seven outside the Coastal Plain. Compared to non-diseased sites, sassafras mortality due to laurel wilt increased rapidly from 2018 to 2020 and occurred in all diameter classes monitored (≥ 5 cm dbh). Flight trapping for the laurel wilt vector, the redbay ambrosia beetle (RAB, *Xyleborus glabratus* Eichhoff) with *α*-copaene lures did not enhance early detection of latent laurel wilt infections. Seasonal flight activity of the RAB in the Piedmont and Mountains suggested two generations per year with little to no flight from December through March.]

- First Report of Laurel Wilt Caused by *Raffaelea lauricola* on Northern Spicebush (*Lindera benzoin*) in Kentucky and Tennessee

Madison J. Eaton[1], Julie Beale[2], Sara Long[2], Tyler J. Dreaden[2,3,4], Alexandra Blevins[5], Albert Mayfield[3], Megan Buland[1], Denita Hadziabdic[6], and Ellen V. Crocker[1,4]
[1]Department of Forestry and Natural Resources, University of Kentucky, [2]Department of Plant Pathology, University of Kentucky, [3]Southern Research Station, USDA Forest Service, [4]Forest Health Research and Education Center, [5]Kentucky Division of Forestry, [6]Department of Entomology & Plant Pathology University of Tennessee.

[**Abstract:** Laurel wilt (LW) is a vascular disease caused by *Raffaelea lauricola* and its primary vector, the redbay ambrosia beetle (*Xyleborus glabratus,* RAB), which were first introduced to the United States (US) from Asia by 2002 (Fraedrich et al. 2008; Harrington et al. 2008). Laurel wilt has since spread across the southeastern US causing the death of millions of native redbay, sassafras, silk bay, swamp bay and other native Lauraceae species (Hughes et al. 2017). Laurel wilt on the understory shrub northern spicebush (*Lindera benzoin*) was previously reported in South Carolina (Fraedrich et al. 2016) and Louisiana (Olatinwo et al. 2021) and is hereby confirmed in Kentucky and Tennessee. Spicebush plants displaying typical LW symptoms were observed in September 2020 on a property spanning the KY/TN border (Christian Co., KY and Montgomery Co., TN). Several dense stands of spicebush exhibited leaf wilt, early fall leaf color, dead leaves on branches, and black streaks of discolored xylem. Laurel wilt was already known from sassafras in the area (Loyd et al. 2020) and there were abundant dead sassafras nearby. Ambrosia beetle frass tubes were observed on spicebush in the field and callow female RABs emerged from containerized bolts of spicebush collected from the site, indicating that the vector used spicebush as a brood host. Samples of spicebush sapwood tissue collected from two symptomatic plants were plated onto CSMA (cycloheximide-streptomycin malt extract agar) media. The cultures were grown at room temperature in ambient light, and a fungus was recovered and further isolated onto MEA (malt extract agar) and PDA (potato dextrose agar) media. The morphology of the two fungal isolates, referred to as LW415 and LW416, matched the typical white mucoid growth and ovoid conidia of *R. lauricola* (Harrington et al. 2008). DNA was extracted from conidia harvested from two-week-old MEA cultures using a modified method of Dreaden et al. (2014). The identity of the fungus was confirmed by performing PCR with the *R. lauricola*-

specific microsatellite primer sets IFW and CHK (Dreaden et al. 2014, Parra et al. 2020). A positive amplification product was obtained for LW415 and LW416 for both primer sets, validating their identification as *R. lauricola*. To confirm pathogenicity, four spicebush seedlings (mean height 22.5 cm; mean ground line diameter 3.3 mm) were inoculated: two with *R. lauricola* isolate LW415 grown on PDA for two weeks at room temperature in the dark, and two were mock-inoculated with sterile PDA as a control. A scalpel was used to nick the spicebush stem at a bud about 5 cm above groundline, and a small agar plug was placed on the wound and wrapped with parafilm. The spicebush seedlings were maintained in a growth chamber with an average temperature of 24°C and a 15 h photoperiod. Wilt symptoms were evident on inoculated seedlings after two weeks, while the control plants remained healthy. Four weeks post-inoculation, black staining of the vascular tissue was present in the symptomatic seedlings, and a fungus matching the morphology of *R. lauricola* was consistently recovered, while no fungus was isolated from the control plants. These results provide additional evidence that northern spicebush populations may be threatened by LW and could serve as a reservoir for the pathogen and vector (Gramling 2010). Monitoring the spread of LW and RAB on spicebush may gain importance as preferred hosts (e.g., sassafras) are killed.

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Gramling, J. M. 2010. Southeastern Naturalist 9:827.
Harrington, T. C. et al. 2008. Mycotaxon 104:399.
Hughes et al. 2017. Biol Invasions 19:2143.
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https://doi.org/10.1094/PDIS-11-20-2511-PDN
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https://doi.org/10.1094/PHP-06-20-0049-RS]

- Efficacy of Propiconazole for Prevention of Sassafras Mortality from Laurel Wilt Using Two Product Delivery Systems.

Rabiu Olatinwo[1], Wood Johnson[2], and Jaesoon Hwang[2].
[1]USDA Forest Service, Southern Research Station, [2]USDA Forest Service, Forest Health Protection.

[**Abstract:** Laurel Wilt is a lethal disease of American Lauraceae caused by *Harringtonia lauricola.* Propiconazole is a systemic fungicide which arrests fungal growth among a variety of plant hosts. Propiconazole as a preventive treatment against laurel wilt in sassafras (*Sassafras albidum*) has not been evaluated. We treated sassafras trees with propiconazole using the ArborJet QUIK-jet® Micro-Injection™ and TREE I.V. Micro-Infusion™ Systems (Arborjet, Inc., Woburn, MA), and challenged trees by inoculating them with *H. lauricola*. Six of seven trees (86%) treated using the QUIK-jet® Micro-Injection™ system survived 52 or more weeks following inoculation *H. lauricola*, while only 11% inoculated control trees (one of nine) survived over this period. All trees not damaged by hurricanes (n=13) treated with propiconazole using the TREE I.V. Micro-Infusion™ system survived significantly longer than untreated control

trees after inoculation with *H. lauricola*; 10 of 13 trees (77%) survived with <50% crown loss, and 8 of 13 trees (62%) appeared entirely healthy 54 weeks post-inoculation. Fifteen of 19 control trees (79%) in the TREE I.V. Micro-Infusion™ system trial had either died or lost ≥50% of living crown 54 weeks post-inoculation with *H. lauricola*. Results indicate sassafras trees treated with propiconazole using the ArborJet QUIK-jet® Micro-Injection™ and TREE I.V. Micro-Infusion™ systems are significantly less likely to die within one year of infection with *H. lauricola*, however some trees may exhibit significant crown decline (≥ 50%) over this period.]

- Ecological Impact of Laurel Wilt on Insect Diversity and Community Composition of Sassafras and Northern Spicebush.

Matthew Longmire,[1] Jerome Grant,[1] Mark Windham,[1] Alan Windham,[2] Albert Mayfield,[3] and Qiusheng Wu[1].

[1]University of Tennessee, Knoxville, TN, [2]University of Tennessee, Nashville, TN, and [3]USDA Forest Service, Southern Research Station, Asheville, NC.

[**Abstract:** The invasive pathogen, *Harringtonia lauricola* sp. nov., that causes Laurel Wilt disease has devastated populations of several plants in the family Lauraceae in the southeastern U.S. While the pathogen was initially constrained to coastal regions, it has since moved inland. In 2019, laurel wilt was found in Tennessee on *Sassafras albidum* (Nutt.) Nees (sassafras). This pathogen is known to be transmitted by *Xyleborus glabratus* Eichhoff (redbay ambrosia beetle), however, it is likely that other species of ambrosia beetles are also capable of vectoring the fungus. More recently, laurel wilt has recently been observed on *Lindera benzoin* (L.) Blume (northern spicebush) at sites where sassafras was already infected. Spicebush is endemic to the eastern U.S. and has a deep cultural significance and rich history in traditional practices by Native Americans and Appalachian region residents. Spicebush is also important from an ecological standpoint for several organisms. The high fatty content of spicebush berries makes them the perfect fuel source for migrating birds. Some insect species, such as larvae of *Papilio troilus* L. (spicebush swallowtails), are known to feed almost exclusively on spicebush or sassafras. Other arthropods may also exhibit a specialized dependence on spicebush. However, the insect diversity and community composition for spicebush is poorly known. Because no treatment to cure laurel wilt or protect plants from infection is currently available, it has the potential to spread through most of the native range of spicebush. If spicebush becomes locally or regionally extinct due to laurel wilt, it is critical to have a basic knowledge of associated insects to gauge which species may become threatened, endangered, or even locally or regionally extinct. Therefore, a multi-year study designed to determine insect diversity and community composition on spicebush was initiated in Tennessee. A relatively small variety of insects were collected from spicebush so far. However, the majority of insects collected were determined to be specialists or semi-specialists of spicebush. While some species did not directly feed on spicebush, they were dependent on spicebush for shelter. These observations suggest that, while the total number of insect species impacted by spicebush mortality might not be large, the majority of these affected species are almost totally dependent on spicebush in some way. If laurel wilt continues to spread through populations of spicebush, several native insect species, such as the spicebush swallowtail, will likely become locally or regionally extinct. This research will inform protection of spicebush and its associated insects in natural areas.]

- Patterns of beetle attack and movement of *Raffalea lauricola* in South Carolina sassafras.

J. Forest Palmer[1], Katy Crout[2], Albert Mayfield III[3], and Jess Hartshorn[1].
[1]Forestry and Environmental Conservation, Clemson University,
[2]Clemson Extension, Clemson University, [3]USDA Forest Service, Southern Research Station.

Open Session II – Ballroom C

Moderator: *Elizabeth McCarty, University of Georgia*

- Use of drones in forest pest management

Dave Kulhavy, Daniel Unger, I-Kuai Hung and Yanli Zhang
Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University. Nacogdoches, Texas

- The Pine Pandemic Preparedness Plan: A collaborative plan for the common good

Kier Klepzig[1], Kamal J. K. Gandhi[2]
[1]Joseph W. Jones Ecological Research Center at Ichauway, GA,
[2]University of Georgia, Athens, GA

[**Abstract:** Non-native invasive species are among the most serious threats to the sustainability of forest ecosystems. As international commerce continues to accelerate, we expect the risks and impacts of these pests and pathogens to grow. The southern pine forests of the USA are invaluable to regional and national economies and provide multiple ecological benefits. While they have yet to deal with a serious threat from a novel damaging pest or pathogen, forest managers are extremely concerned about their potential to impact these valued assets.

There is currently no ready-to-use cohesive and systematic plan in place to address a new threat to pine forests in the South. We assembled a diverse and multidisciplinary team to craft the Pine Pandemic Preparedness Plan (P4) which directly addresses the grand challenge: How can we best prepare for future high-impact non-native invasive pests or pathogens that could have catastrophic impacts on our pine commodity? In-depth group discussions since 2020 have yielded a draft P4 with four integral components that need to be developed including a communication network; detection and delineation tactics; delimitation and assessment methodology; and effective responses to threats. Specifically, we recommend creation of: 1) a comprehensive communication plan with representation from all stakeholders and real-time flow of information on new invasive species; 2) a region-wide system for early evaluation and detection of tree mortality from high-impact invasive species; 3) a common decision tree for onsite evaluations of impacts; 4) a real-time database on wood movement across the region to allow effective quarantine efforts; and 5) the establishment of P4 as a central hub for providing information and support structure for effective control and management strategies for new invasive species.]

- What lies below: The presence of dead wood and bluestain fungi does not alter leaf litter brown food webs after 1 year

  Nicholas Benedetto[1], John Riggins [2], Courtney Siegert [3], Juliet Tang [4], Natalie Clay[1]

  [1]School of Biological Sciences, Louisiana Tech University, Ruston, LA [2]Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology, Mississippi State University, [3]Department of Forestry, Forest and Wildlife Research Center, Mississippi State University, [4]USDA Forest Service, Forest Products Laboratory, Starkville, MS

- Bark Beetle Attack Effects on Coarse Woody Debris Decomposition, Termites, Beetles and Ants: Patterns Vary Across Space and Time.

  Natalie Clay[1], Courtney Siegert[2], Juliet Tang[3], John Thomason[4], John Riggins[4]

  [1]School of Biological Sciences, Louisiana Tech University [2]Department of Forestry, Forest and Wildlife Research Center, Mississippi State University, [3]USDA Forest Service, Forest Products Laboratory, Durability and Wood Protection, Starkville, MS [4]Department of Biochemistry, Molecular Biology, Entomology, & Plant Pathology, Mississippi State University

3:00 – 3:30 Break

3:30 – 5:00 Concurrent Session IV

Discussion of employment options for students in forest health – Ballroom DE

Moderator: *Scott Salom, Virginia Tech*

- Academic Field
  Kamal Gandhi, University of Georgia
- Feds USFS FHP
  Bob Rabaglia, US Forest Service
- Feds USFS R&D
  Bud Mayfield, US Forest Service
- State Government
  Lori Chamberlin, Virginia Department of Forestry
- Private Industry
  Kevin Chase, Bartlett Tree Experts

[**Session Abstract:**
Panel
- State Government, Lori Chamberlin, Virginia Department of Forestry
- Feds USFS FHP, Bob Rabaglia, US Forest Service
- Feds USFS R&D, Bud Mayfield, US Forest Service
- Academic Field, Kamal Gandhi, University of Georgia
- Private Industry, Kevin Chase, Bartlett Tree Experts

There are diverse employment opportunities to students in forest health. Many students lack detailed information on the possibilities and options for a career in forest health. A panel discussion took place to present the current state of knowledge on position activities in different employment sectors. Each panelist gave an overview of what their job entails, specialized

training and skills recommended for their jobs, best and worst parts of the job, that the future looks like in their sector, and lastly some advice to students interested in these kinds of positions. After overview presentations, there was lots of questions and discussion that appeared to leave future forest health professionals better informed. While there are differences in responsibilities, training, and even pay for each type of position, it was pretty clear that the prospects for jobs in the forest health sector looks good in the near future.]

Open Session III – Ballroom C

Moderator: *Steve Clarke, retired*

- From *Adelges* to *Zeugophora*: A look at the factors driving impact and how we can predict the next high-impact introduced forest insects in North America.

  Ashley Schultz[1], Nathan P. Havill[2], Travis D. Marsico[3], Carissa F. Aoki[4], Matthew P. Ayres[5], Kamal J.K. Gandhi[6], Daniel A. Herms[7], Angela M. Hoover[8], Ruth A. Hufbauer[9], Andrew M. Liebhold[2], Scott Maco[7], Kenneth F. Raffa[10], Kathryn A. Thomas[8], Patrick C. Tobin[11], Daniel R. Uden[12], and Angela M. Mech[13]

  [1]Mississippi State University, [2]USDA Forest Service, [3]Arkansas State University, [4]Bates College, [5]Dartmouth College, [6]University of Georgia, [7]Davey Tree Expert Company, [8]United States Geological Survey, [9]Colorado State University, [10]University of Wisconsin, [11]University of Washington, [12]University of Nebraska-Lincoln, [13]University of Maine

- Risk-based surveillance of an imminent invader in the EU: the EFSA pest survey toolkit and the emerald ash borer *Agrilus planipennis*.

  Ignazio Graziosi, Alice Delbianco, Jose Cortiñas Abrahantes, and Sybren Vos, European Food Safety Authority (EFSA), PLANTS Unit

  [**Abstract:** The emerald ash borer (EAB) *Agrilus planipennis* is approaching the European Union territory, where the beetle is subjected to mandatory surveillance. We developed three integrated tools for preparing and designing the surveys. The *Pest Survey Card on Agrilus planipennis* (https://arcg.is/09S94u) helps to define the target population of *Fraxinus* hosts and the methods for detecting the insect. The survey area is divided in epidemiological units (administrative boundaries and/or land use), risk locations are associated with higher probability of EAB presence, and risk areas identified based on the presence of ash resources. Trapping insects using green funnel traps is the recommended method early detection, and it can be combined with other techniques. The *Guidelines for statistically sound and risk-based surveys of Agrilus planipennis* (https://www.efsa.europa.eu/en/supporting/pub/en-1983) propose a step-wise approach for designing detection surveys to substantiate pest freedom and delimiting surveys for defining the boundaries of an infested zone. The method sensitivity, the confidence level and an appropriate design prevalence feed into the statistical tool *RIBESS+* (https://arcg.is/0vWufj1), which calculates the sampling effort required to survey the target population. The proposed toolkit ensures harmonized survey conclusions that can be compared in time and space, thus providing robust evidence for pest freedom.]

- Performance of emerald ash borer (*Agrilus planipennis*, Coleoptera: Buprestidae) larvae is apparently regionally specific, and may have implications for population dynamics and biological control.

Todd D. Johnson[1], Casey C. Coupe[1], Chris Ziadeh[1], Dalton Wilbur[1], Julia R. Gould[2], Jeff R. Garnas[1]
[1]Department of Natural Resources and the Environment, University of New Hampshire, [2]USDA-APHIS, Buzzards Bay, MA

[**Abstract:** The emerald ash borer (Coleoptera: Buprestidae: *Agrilus planipennis* Fairmaire) is a woodboring beetle that feeds within the phloem of its hosts. Since its accidental introduction to North America, it has killed millions of ash trees (*Fraxinus* spp.) across the continent. The rapid growth of its populations and associated tree mortality has been attributed to a lack of a co-evolutionary relationship between hosts and natural enemies in its introduced range. Thus, classical biological control (i.e., the intentional release of antagonists from the native range of an invasive pest) has been implemented to reduce the population growth of emerald ash borer. Key to a successful program of biological control is identifying when susceptible stages of a target insect are available for parasitism or predation. When doing so, it is critical to evaluate larval growth across each species of host. Rates of larval development can vary between hosts due to differential composition of nutrients and plant defenses. If larvae of the emerald ash borer vary in their rate of development between hosts, then this may have consequences for the establishment and population growth of introduced biological control agents.

Theory suggests that plants vary their allocation of resources between growth and defense. Our preliminary data on tree chemistry indicates that after attack, trees have different compositions of defensive metabolites within their phloem. Thus, we conducted a two-year study in eight field sites (four each year, two per species of ash) to test the prediction that ontogenetic stage of tree would influence the survival and proportion of larval instars of the emerald ash borer found in green and white ash. We specifically hypothesized that younger trees would have experienced greater selective pressures to defend themselves, and thus cause greater mortality to the emerald ash borer. Older trees however, were hypothesized to allocate greater resources to reproduction (and less to defense), allowing for greater survival of emerald ash borer. Each year we did the following—Trees were artificially infested with emerald ash borer eggs during their flight season. We also released two species of introduced biological control agents, *Spathius galinae* (Hymenoptera: Braconidae), and *Tetrastichus planipennisi* (Hymenoptera: Eulophidae) in August and September when susceptible stages of larvae were predicted to occur. In October, we felled artificially infested trees and quantified the survival and development (instar, length of gallery, weight) of emerald ash borer larvae, including the presence of biological control agents.

We found that tree size and species did not predict the survival of emerald ash borer larvae. Year and location of study both significantly impacted survival. While we found no differences in survival between tree species, we found that larvae consistently created longer galleries, were heavier, and had more susceptible stages ($3^{rd}/4^{th}$ instar) to biocontrol agents in white, as compared to green ash. While not significant, there was a trend towards greater parasitism in white, as compared to green ash. We attribute this to sample size, as there were significantly more susceptible larvae in white ash. Altogether, our results suggest that composition of ash within a forest may influence emerald ash borer population dynamics and the likelihood of parasitoid establishment.

Furthermore, emerald ash borer performance may vary regionally—previous work in Michigan (e.g., Chen et al. 2012) showed that emerald ash borer performed better in green, as compared to white ash. These questions should be explored further with chemical analyses, as well as field and laboratory experiments. Our results contribute to a greater understanding of how environmental heterogeneity influences tri-trophic interactions, and more specifically may lead to increased success in parasitoid establishment and greater control of the emerald ash borer.]

- Historical records of forest insects.
  Stephen Clarke, Retired

  [**Abstract:** Forest insects often have been utilized in popular music. Bands and record labels named after forest insects will be discussed, as well as songs written about forest insect outbreaks.]

5:00 – 6:00 **Closing Business Meeting – Ballroom C**

7:00 – 9:00 **Banquet – Ballroom ABC**
Insect Photo Salon
Organizers: *Brittany Barnes, University of Georgia; Tom Sheehan, Jones Center at Ichauway*

Graduate Student Presentation Awards, A.D. Hopkins Award, and Roger F. Anderson Award

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2022 SFIWC Posters

Organizer: Jess Hartshorn, Clemson University

1. Phenology of Elongate Hemlock Scale on Fraser Fir Christmas Trees in NC
   Dominic Manz, North Carolina State University; Robert Jetton, North Carolina State University, Camcore; Jeff Owen, North Carolina State University Forestry Extension; and Andy Whittier, North Carolina State University, Camcore

2. Strengthening the firewall against invasive insects: the EFSA plant pest survey toolkit
   Ignazio Graziosi, Alice Delbianco, Luka Mustapic, Melanie Camilleri, Jose Cortiñas Abrahantes, and Sybren Vos, European Food Safety Authority (EFSA), PLANTS Unit

   [**Abstract:** The European Union' Commission Implementing Regulation 2019/2072 lists Union quarantine plant pests (including over 400 insect taxa) for which EU member states are required to conduct surveys. We developed a *Plant Pest Survey Toolkit* (https://arcg.is/1v99CH) in line with the International Standards for Phytosanitary Measures to assist member states with surveillance activities. Detection (substantiating pest freedom of an area) or delimiting surveys (defining the boundaries of an infested zone) are completed through three-step process: preparation, design and implementation. 1) *Pest Survey Cards* help gathering relevant information for survey preparation. They are designed to characterize the target population (epidemiological units and risk areas are linked with environmental suitability, host range, and the pest' spread capacity), select an effective detection method, and appropriate inspection units. 2) *Guidelines for statistically sound and risk-based surveys of plant pests* are used to design the survey by defining the host population size, and setting method sensitivity, confidence level and design prevalence. The required sample effort is calculated through the RIBESS+ statistical tool. 3) Inspection units are allocated to the survey sites and surveys are implemented at member state level according to the design. This approach contributes to a cross-country harmonization of surveillance activities.]

3. Longleaf Pine Canopy Arthropods in Southwestern Georgia
   N. Royce Dingley, University of Georgia; Tom Sheehan, Joseph W. Jones Ecological Research Center; Kier D. Klepzig, Joseph W. Jones Ecological Research Center; Elizabeth McCarty, University of Georgia

   [**Abstract:** The longleaf pine, *Pinus palustris,* communities of the southeastern Coastal Plain have diminished significantly since European colonization and the subsequent timber needs of the growing population, fire suppression, and storms. Studying an ecosystem home to many threatened species provides important information to forest and land stewards as they prepare comprehensive management plans. In general, there has been limited research on tree canopies in the southeastern United States. The only coniferous tree canopy studies in the Southeast involves eastern hemlock, *Tsuga canadensis*. A research project is underway at the Jones Center at Ichauway to sample arthropods in the mid-canopy of healthy longleaf pines in three different ecological communities. The ecological communities (flatwoods, upland, and fluvial terrace) are the study treatments. Arthropods are sampled with flight-intercept traps that are deployed for one week each month from May to August 2022. Specimens will be identified to family level, and some groups will be identified further. Species richness and abundance will be analyzed to determine if there is a difference among the ecological communities. This novel study will document canopy arthropods living in longleaf pines, a previously understudied component of the longleaf pine ecosystem and will lay a foundation for future canopy studies.]

4. Evaluating the role of herbicide use to conserve wild bee communities in working pine forests

   Emma L. Briggs, University of Georgia; Daniel U. Greene, Weyerhaeuser Company; Christine Cairns Fortuin, University of Georgia; Brittany F. Barnes, University of Georgia; Kamal J.K. Gandhi, University of Georgia

   [**Abstract:** Working loblolly pine (*Pinus taeda*) forests rely on herbicides to remove understory plant cover and promote forest productivity, but there has been limited research on the effects of herbicide applications on wild bee communities in forest ecosystems. To conserve wild bees in working pine forests, we are conducting a two-year study to evaluate how different herbicide application treatments impact wild bee communities. Our objectives are to: 1) evaluate the indirect effects of herbicide use on wild bee populations and communities over a two-year period; 2) simultaneously assess changes in understory plant communities; and 3) analyze linkages between changes in understory plant communities and wild bee responses. We are conducting the study in loblolly pine stands in the Piedmont region of Georgia, where the herbicide imazapyr is commonly used to control competing vegetation. Stands of two age classes (early establishing or thinned mid-rotation) underwent imazapyr application through either 1) aerial or skidder broadcast spray; 2) backpack spray with banded application; or 3) control with no herbicide. We are now sampling the wild bee community at each of the stands using blue, yellow, and white pan traps and blue vane traps and recording stand characteristics such as tree size, understory floral resources, and canopy openness. This study will provide critical information on how herbicides can be used to increase site productivity in working loblolly pine forests, while also conserving wild bees and their vital pollination services.]

5. Reintroduction of the imperiled frosted elfin butterfly (*Callophrys irus*) to Georgia

   Thomas N. Sheehan, The Jones Center at Ichauway; Robert T. Meyer, Tall Timbers Research Station; Lisa M. Giencke, The Jones Center at Ichauway; Allie Snyder, The Jones Center at Ichauway; Dave McElveen, Tall Timbers Research Station; and Kier D. Klepzig, The Jones Center at Ichauway

   [**Abstract:** The frosted elfin butterfly *Callophrys irus* (Godart) (Lepidoptera: Lycaenidae) is considered for listing under the Endangered Species Act by 2024 and was extirpated from Georgia. The Apalachicola National Forest (ANF) in Florida contains the only frosted elfin population considered "high condition." The Jones Center at Ichauway is a nonprofit ecological research center in southwestern Georgia that contains healthy populations of the frosted elfin's host plant—sundial lupine—but no frosted elfin butterflies. We translocated thirty last-instar larvae from the ANF approximately 100km north to the Jones Center at Ichauway on April 20th, 2022. We will translocate an additional thirty adults in the spring of 2023. Marked recapture will be conducted to compare the two translocation methods.]

6. Who Even Cares About Forest Health? Non-industrial private forest landowners' interest in forest health education

   Kristin Peters, Robert Bardon, Rajan Parajuli, Kelly Oten, North Carolina State University

7. Spatiotemporal changes in invasion speed by laurel wilt disease

   Samuel F. Ward and John J. Riggins, Mississippi State University

8. Abiotic and biotic factors associated with dogwood decline across the Southeastern United States

   Rabiu Olatinwo, USFS-SRS Pineville LA; Stephen Fraedrich (retired), USFS-SRS Athens, GA; and Wood C. Johnson, USFS-SRS Athens, GA

[**Abstract:** Flowering dogwood (*Cornus florida*) is a common forest understory tree widely distributed across the eastern United States. The species experienced localized and regional declines across its natural habitat in recent decades. Although, populations decline has been attributed in part to dogwood anthracnose caused by *Discula destructiva*, climatic events such as drought, hurricane, and flooding may be significant factors contributing to the declines. The specific objectives were to; 1.) determine changes in dogwood populations in the south in last few decades, 2.) identify abiotic and biotic factors that are associated with dogwood decline using the FIA data, climate information, and field survey. The goal is to understand the decline problem and develop monitoring options to help management decisions. The study method had three steps: *i).* the analyses of FIA historical data primarily focusing on abiotic/biotic agents (AGENTCD) and the actual year of tree mortality (MORTYR), since the inventory year variable (INVYR) lag the MORTYR, and 186,871 dogwood trees evaluated across FIA plots in12 states in the southeastern US from 1958 -2018 were analyzed using the FIADB User Guide P2_8-0, *ii).* identification of risk agents and establishing the link between climatic data from the National Oceanic and Atmospheric Administration (NOAA) and the FIA dogwood mortality, and *iii).* verification of dogwood tree condition through field evaluations and surveys of declining dogwood stands in 2020 and 2021. Results showed that dogwood tree mortality increased significantly during from 1979 to 1981, 1986 to 1989, 1999 to 2000, and 2008 to 2009. The highest mortality across the region occurred between 1986 and 1989. FIA data showed 36% of mortality resulted from silviculture/land clearing activities, 31% from vegetation impacts, 17% from diseases, while the remaining individual agents accounted for a little over 0% to 7%. The study also identified differences in tree mortality in two recent decades (1998 – 2018). Tree mortality reduced significantly in AL, GA, NC, TN, and VA during 2008 to 2018 compared to 1998 to 2007 period. Dogwood anthracnose was not detected at sites surveyed in 2020 and 2021. Symptoms associated with dogwood trees varied across sites indicating site-specific factors played important roles in the dogwood decline. Overall, continuous exposure of dogwood to stressors such as drought, pathogens/pests, and direct sunlight because of overstory tree harvesting/canopy opening may increase the likelihood of decline in the future.]

9. Systematic release/recovery and competition studies of *Leucotaraxis* silver flies, predators of Hemlock Woolly Adelgid (Hemiptera: Adelgidae)
   Olivia Andrews, Virginia Tech; Scotty Yang, Virginia Tech; Albert Mayfield, USDA-FS; Mark Whitmore, Cornell University; and Scott Salom, Virginia Tech

10. Relationships among kudzu, kudzu bug, and *Beauveria bassiana*
    Jerome Grant and Kassie Hollabaugh, University of Tennessee, Knoxville

11. Recovery of parasitoids of emerald ash borer in Tennessee
    David Bechtel and Jerome Grant, University of Tennessee, Knoxville

12. Impact of ovisac disturbance on HWA egg viability following *Laricobius* spp. predation
    Aryanna James, Virginia Tech; Carrie Jubb, Virginia Tech; Jeremiah Foley, USDA-ARS; Holly Gatton, Virginia Tech; and Scott Salom, Virginia Tech

    [**Abstract:** The hemlock woolly adelgid (HWA) is a significant tree-killing, non-native pest of hemlock trees in the eastern USA. *Laricobius nigrinus* and *Laricobius osakensis* (Coleoptera: Derodontidae) are specialized predators of HWA sistens, nymphs, and adults and progrediens eggs in their native ranges in western USA and Japan, respectively. Mass rearing and release efforts have led to the establishment of both *Laricobius* spp. in the eastern USA as biocontrol agents of HWA. Ovisac disturbance or enumeration of ovisacs disturbed is used to characterize the impact of *Laricobius* spp. However, it has been observed that *Laricobius* larvae leave some

eggs uneaten. Further studies are needed to better understand predation by *Laricobius* spp. larvae. Our aim was to determine 1) the number of ovisacs disturbed by a single *Laricobius* larvae, 2) if disturbance rate is related to the number of eggs present within ovisacs, and 3) if predation can cause indirect effects to ovisacs. 90 hemlock branches with 10 ovisacs each were assigned to three species treatments: *L. nigrinus*, *L. osakensis*, and control with no beetle. One egg of a respective species was placed in an ovisac and allowed to feed until larval development. Number of disturbed ovisacs and dead HWA crawlers were quantified following drop of prepupal larvae. It was found that a single *Laricobius* larvae disturbed about 7 (± 1.8) ovisacs during its development, regardless of species. We did not find evidence to suggest that the number of ovisacs disturbed was related to number of HWA eggs present in the ovisac. About 4% of HWA eggs or crawlers were lost to indirect mortality (i.e., entrapment in honeydew or hemolymph), suggesting that eggs uneaten by *Laricobius* larvae can likely hatch and disperse. A second trial will be conducted with periodic destructive sampling and improved arenas to better account for the number and fate of HWA eggs and crawlers from ovisacs.]

13. Legacies of disturbance management: How do post-hurricane salvage logging and soil compaction affect ant communities in a longleaf pine ecosystem?
    O.M. Nikolaidis, University of Georgia; J.T. Vogt, USDA-FS-SRS; K.D. Klepzig, Jones Center at Ichauway; and K.J.K. Gandhi, University of Georgia

14. Forest Health Citizen Science Communication Using Drones
    David L. Kulhavy, Daniel Unger, Yanli Zhang, I-Kuai Hung and Reid Viegut, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas

15. Crapemyrtle Locations Using Drones, Google Earth Pro and Pictometry to Measure Crapemyrtle Bark Scale and Sooty Mold Infestations
    David L. Kulhavy, Daniel R. Unger, I-Kuai Hung, Reid Viegut, Andrew Boughton and Yanli Zhang, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas

16. Modelling Density of Asian Longhorned Beetle Activity by Canopy Height and Branch Diameter
    Meredith S Bean, Forestry and Environmental Conservation, Clemson University; R. Talbot Trotter, USDA Forest Service, Northern Research Station; Scott Pfister, USDA APHIS, PPQ, S&T, Otis Laboratory; and David R Coyle, Forestry and Environmental Conservation, Clemson University

17. Efficacy of Biological Control of *Anoplophora glabripennis* Using Native Parasitoid in Hollywood, South Carolina
    John Marina Lupu and David R. Coyle, Forestry and Environmental Conservation, Clemson University

18. Creating an Asian Longhorned Beetle Outreach Program in South Carolina
    Katy Crout, Clemson Extension; Haley Ritger, Clemson Department of Plant Industry; Robert Ritger, Clemson Extension; and David R. Coyle, Clemson Extension

19. Evaluating the Efficacy of Biocontrol for Emerald Ash Borer in Georgia
    Mitchell Green, University of Georgia; Brittany F. Barnes, University of Georgia; Lynne Womack, Georgia Forestry Commission; and Kamal J.K. Gandhi, University of Georgia

[**Abstract:** Emerald ash borer (*Agrilus planipennis*) (EAB) (Coleoptera: Buprestidae) is a non-native pest of ash (*Fraxinus* spp.) that has killed tens of millions of trees in the U.S. As EAB continues to spread across the country, biological control through the release of hymenopteran parasitoids is the main management strategy being deployed to help slow its spread in forested areas. Our objective with this project is to locate suitable biocontrol release sites, and to release and recover two parasitoids of EAB in Georgia over the course of two years. Five sites across the piedmont region of Georgia were selected in early 2022 by USDA-APHIS as biocontrol release sites. Releases of *Oobius agrili* (Hymenoptera: Encyrtidae) began in May 2022 across all sites and releases of *Spathius agrili* (Hymenoptera: Braconidae) began in June 2022. By the end of the summer, we will have released approximately 1,400 individuals of each parasitoid species at each site. Data for forest attributes such as species frequencies, species dominance, and percent ash basal area were also collected at each release site this year and will be correlated with EAB impacts to assess annual progression of ash mortality. Parasitoid releases will continue in 2023 and we will evaluate establishment of parasitoids in 2024. Our work will demonstrate the efficacy of biocontrol methods to mitigate the local impact of EAB in the southern range of many ash species.]

Minutes of the SFIWC Business Meeting
(held in conjunction with 7th NAFIWC)
Tuesday, May 25, 2021

Virtual

Chair Lynne Rieske-Kinney called the SFIWC business meeting at the 7th North American Forest Insect Work Conference to order at 4:05 PM. She welcomed everyone to the virtual Zoom meeting and asked first-time attendees to introduce themselves. The group then paused for a moment of silence in remembrance of noted forest entomologist, Steve Seybold (USDA Forest Service), and SFIWC members, Bob Sommers (USDA Forest Service), John Witter (University of Michigan), Denny Ward (USDA Forest Service), and Jack Coster (Stephen F. Austin University and West Virginia University), who passed away since the 2019 meeting. Members were invited to share announcements of professional transitions (none) or retirements (Fred Stephen, Stephen Fraedrich, Susan Best, and Chip Bates).

Reports

Secretary-Treasurer Will Shepherd reported that the minutes of the 2019 meeting in Savannah, Georgia are available in the Proceedings on the SFIWC website. Financially, SFIWC had a checking account balance of $5,067.72 on 12/31/20. Income for the Savannah meeting exceeded expenses by $181.91, but SFIWC paid $2000.00 for a website redesign in 2019.

Paul Merten read the Historian's Report (see attached) with information on impacts of previous NAFIWC meetings on SFIWC.

A.D. Hopkins Award – No award presented during years when NAFIWC replaces SFIWC.

Roger F. Anderson Award – Kamal Gandhi said that the award's recipient would be announced at the Student Awards on May 27 [Jeremiah Foley, a Ph.D. student of Scott Salom at Virginia Tech, was later presented with the award]. Kamal announced that her Ph.D. student, Holly Munro (University of Georgia), was the recipient in 2020 (no meeting due to COVID-19).

Resolutions – Kamal Gandhi reported that the resolution, Support for Forest Health, introduced by Fred Hain, was unanimously approved by the membership in February, 2021, and is now available on the SFIWC website.

Website – Will Shepherd (reporting for Elizabeth McCarty) stated that Bugwood is still maintaining the SFIWC website. Any updates for the website can be sent to him or Elizabeth. The direction of the website will be determined by the information sent in by SFIWC members.

Theses and Dissertations – David Kulhavy not present.

Old Business

None. Discussion of change of scope and name of SFIWC is deferred until the 2022 meeting.

New Business

No new officer elections until the 2022 meeting.

Chair Rieske-Kinney announced that the 2022 SFIWC will be held June 21-23, 2022, in Lexington, Kentucky (postponed from 2020 due to COVID-19 travel restrictions).

The 2023 SFIWC is still planned for North Carolina (likely Raleigh). Robert Jetton and Kelly Oten will be contacted to determine if they still want to host the 2023 meeting.

There being no further business, the meeting adjourned at 4:30 PM.

Respectfully submitted,

William P. Shepherd, Secretary-Treasurer

Minutes of the SFIWC Opening Business Meeting
Tuesday, June 21, 2022

Lexington Marriott City Center
Lexington, Kentucky

Chair Lynne Rieske-Kinney called the 61st meeting of the Southern Forest Insect Work Conference to order at 1:12 PM, following a welcome to Lexington by Brandon Howard, State Forester of Kentucky. Chair Rieske-Kinney welcomed everyone and thanked all of the meeting organizers. She asked first-time attendees to stand and introduce themselves. The group then paused for a moment of silence in remembrance of SFIWC members, Dave Drummond (USDA Forest Service), Mark Dalusky (University of Georgia), and David Wakarchuk (Synergy Semiochemicals Corp.), who passed away since the 2021 NAFIWC meeting. Members were invited to share announcements of professional transitions or retirements. Robert Trickel retired in January. Holly Munro is now a senior research scientist at the National Council for Air and Stream Improvement and an adjunct assistant professor at University of Georgia.

Reports

Secretary-Treasurer Will Shepherd reported that the minutes of the 2019 meeting in Savannah, Georgia are available in the Proceedings on the SFIWC website. Financially, SFIWC had a checking account balance of $4,620.33 on 12/31/21. Income for the Savannah meeting exceeded expenses by $181.91. Will announced that SFIWC donated $100.00 to the Canadian Cancer Society in memory of David Wakarchuk.

Paul Merten read the Historian's Report (see attached) with highlights of the meeting previously held in Kentucky in 1979.

A.D. Hopkins Award – Lynne Rieske-Kinney, Chair, reported that the Hopkins Award committee would meet later in the day and that if there was a recipient, an announced would be made at the Thursday banquet. She also reminded everyone that Steve Clarke would give his A.D. Hopkins Presentation later in the afternoon.

Roger F. Anderson Award – Scott Salom, Chair, said that the award's recipient would be announced at the Thursday banquet.

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

Jess Hartshorn proposed that the Graduate Student Session and Awards be renamed in honor of Fred Stephen. A discussion and vote will take place at the closing business meeting.

Website – Elizabeth McCarty asked everyone to submit photos to the SFIWC website.

Theses and Dissertations – David Kulhavy reported that he plans to have all student theses and dissertations listed and linked on the SFIWC website. SFIWC will need to check with the universities to do this.

Chair Rieske-Kinney 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 God's Pantry Food Bank in Lexington.

Local Arrangements – Chair Rieske-Kinney thanked everyone who helped her with the local arrangements for this year's meeting: Will Shepherd, Beth Kyre, Flávia Pampolini, and Alexandra Blevins. She also thanked Zachary Bragg, Mary Wallace, and Morgan Knutsen for their assistance. Suggestions and information on activities around Lexington can be found at the registration table.

Lynne Rieske-Kinney reminded everyone to sign up for bus transportation to and from the Field Trip/Frustrana Cup site: the Lexington Distillery District (distillery tours available).

Beth Kyre gave details on the Frustrana Cup horseshoes tournament to be held on Wednesday afternoon at Ethereal Brewing.

Bob Coulson announced that the Frontalis Cup golf tournament was canceled for the first time since 1991, due to lack of participation.

Old Business

Steve Clarke gave an update on the resolution to create a SFIWC YouTube channel. He talked to Chuck Bargeron about it but had no new information.

Lynne Rieske-Kinney asked everyone to attend the session on the proposed SFIWC scope and/or name change later that afternoon (led by Scott Salom).

New Business

Nominations – SFIWC needs a Chair Elect and a new Counselor to replace JT Vogt for a three-year term on the Executive Committee. Voting on nominees will be held during the closing business meeting. Contact Lynne Rieske-Kinney (Chair) or JT (Counselor) if you wish to submit a nomination.

Elizabeth McCarty announced that her term as Graduate Student Session Coordinator is ending and asked for a volunteer to take over her duties. The new coordinator will be announced at the closing business meeting (no vote needed).

SFIWC 2023 – Kelly Oten and Robert Jetton, 2023 Local Arrangements Co-Chairs, invited everyone to next year's meeting, July 25-27 in Raleigh, North Carolina. Volunteers for Program Chairs are needed.

Chair Rieske-Kinney thanked this year's Program Chairs, Molly Darr and Katlin DeWitt for their diligent work in putting together a great agenda.

Tom Sheehan will lead insect light sheeting tonight at 8:00 PM at the University of Kentucky Arboretum.

Photo Salon – Tom Sheehan will be taking over Photo Salon duties this year for the absent Brittany Barnes. He said that winners would be announced at the Awards Banquet on Thursday, with "Best in Show" winning $50 and a spot on next year's SFIWC program cover. He also asked that everyone participate in the group photos during the afternoon break.

Graduate Student Session – Lynne Rieske-Kinney invited everyone to the session on Wednesday, which was organized by Elizabeth McCarty (Graduate Student Session Coordinator).

Poster Session – Lynne Rieske-Kinney asked everyone to attend the Wednesday night poster reception, organized by Jess Hartshorn.

Will Shepherd stated that CFEs from Society of American Foresters (SAF) will be available after the conclusion of the meeting for anyone who requested them.

Bob Coulson led everyone in thanking Lynne Rieske-Kinney for all of her hard work as this year's SFIWC Chair.

There being no further business, the meeting adjourned at 1:58 PM.

Minutes of the SFIWC Closing Business Meeting
Thursday, June 23, 2022

Lexington Marriott City Center
Lexington, Kentucky

Chair Lynne Rieske-Kinney called the meeting to order at 5:08 PM.

She thanked all of the organizers, presenters, and students.

Old Business

SFIWC Food Drive – Lynne Rieske-Kinney thanked everyone for their donations of food and cash, totaling $800.00, for God's Pantry Food Bank!

Frustrana Cup – Beth Kyre reported that the team of Kevin Chase and Flávia Pampolini won the horseshoes tournament on Wednesday afternoon.

Election of Counselor – Demian Gomez, Todd Johnson, and Brian Sullivan were nominated as candidates for SFIWC Counselor, 2022-2025. The members voted, and Brian was elected.

Election of Chair-Elect – Kamal Gandhi was nominated as candidate for SFIWC Chair-Elect, 2022-2023. The members voted, and Kamal was elected. She will later transition to SFIWC Chair, 2023-2025.

Elizabeth McCarty announced that Ashley Schulz has agreed to be the new Graduate Student Session Coordinator.

Jess Hartshorn moved that SFIWC rename the Graduate Student Session as the "Fred Stephen Graduate Student Symposium." The motion passed. She also moved that the graduate student presentation awards be named for Fred Stephen. This motion also passed.

SFIWC 2023 – Kelly Oten and Robert Jetton told everyone that next year's meeting in Raleigh, North Carolina will be held at the Sheraton Raleigh Hotel and that Jess Hartshorn and Scott Salom volunteered to be the Program Co-Chairs.

New Business

Chair Rieske-Kinney announced that Synergy Semiochemicals Corp. will be donating $5000.00 to establish the Wakarchuk Student Development Fund, in memory of the longtime SFIWC member and founder of Synergy Semiochemicals Corp., David Wakarchuk. The Executive Committee discussed using the donation as a "seed" and eventually build the fund to at least $25,000.00, with the goal to use interest from the fund to lower the student registration fee for future SFIWC meetings. Lynne Rieske-Kinney moved that a committee be established to oversee the fund and solicit additional donations. She would be the initial Chair of this committee. Guidelines for using the fund would be revisited every 10-15 years. The motion passed.

Lynne Rieske-Kinney stated that based on discussions with the SFIWC Executive Committee, she moved to increase all student award amounts and modify who receives the student presentation awards. The Roger F. Anderson Award would be increased from $300.00 to $500.00. The 1st Place ($200.00) and Runner-Up ($100.00) student presentation awards would be replaced with awards for the highest scoring Ph.D. student ($300.00) and Master's student ($200.00) presentations. The motion passed.

Scott Salom led a discussion of possible next steps for the membership to take following his "Future of SFIWC" presentation on Tuesday. Potential paths for SFIWC could include: 1) an official expansion of the scope of the organization, 2) an official expansion of the scope coupled with a corresponding change in name, 3) an official expansion of the scope coupled with retention of the current SFIWC name, and 4) no changes in scope or in name. SFIWC's revised scope could include both biotic and abiotic agents that affect tree health, in addition to insects, and the official SFIWC guidelines ("mission statement") would be amended to reflect this change. If that is the path recommended by the Executive Committee and approved by voting members, a new name could be chosen for the organization that better reflects the expanded scope. There was a general consensus that "Southern Forest Health Work Conference – SFHWC" would be the best choice, partially due to the pronunciation the acronym being the same as "SFIWC."

Arguments both for and against the scope/name change were made. Those favoring the change contended that:

- the proposed updates better reflect the current position of forest entomology within the context of forest health, as many universities and government agencies are now addressing forest health issues as an interconnected challenge and are moving away from separate departments/units.
- decreasing SFIWC's emphasis on entomology would make the organization more inclusive and welcoming to other forest health specialists, such as pathologists.

Members speaking against changing SFIWC's scope/name noted:

- SFIWC would lose its identity and become too similar to other forest health meetings.
- concerns over how awards would be determined, as they currently recognize achievements in forest entomology and are voted on primarily by entomologists.

Results of an online survey sent out to the membership in 2019 showed a large majority (80%) of respondents supported an expansion of SFIWC's scope, and a majority (60%) of respondents supported a name change. Some pointed out that the 2019 survey results were not official and did not capture the opinions of the entire membership on such an important issue. It was noted that SFIWC is a thriving, vital organization with or without a change in scope or name. It was also noted that student members, many of whom are transient and only attend SFIWC during their formal graduate education, might have a disproportionately large representation at meetings, where an official vote on changing SFIWC would occur. There was a call to release the demographic data of survey respondents, but this information is not made available. There was also a suggestion to send out a new survey.

In association with the change in scope/name, potential changes to the SFIWC program were discussed. A proposal was made to replace the Program Co-Chairs with a Program Committee to ensure that a broader range of forest health issues would be included in the programs. However, the membership generally disagreed with a recommendation to allocate a defined percentage of the program to non-entomological presentations.

There was a general consensus that the first step in changing the scope of SFIWC should be to critically evaluate and potentially update the SFIWC mission statement/guidelines. Several

members added that a name change could be explored after a trial period during which an effort would be made to expand the SFIWC program and membership to include more forest health specialists.

After hearing from everyone who wished to contribute, Chair Rieske-Kinney moved to table further discussion on the change in SFIWC's scope/name to allow the Executive Committee to review potential updates to the SFIWC mission statement/guidelines and to fully assess the effects of these changes with respect to the structure and composition of the Executive Committee, nominations, and professional and student awards. The motion passed.

Kelly Oten thanked Courtney Smith for her excellent work as SFIWC's Social Media Manager.

David Kulhavy led the membership in thanking Lynne Rieske-Kinney for everything she did as SFIWC Chair to organize this year's successful meeting.

There being no further business, Chair Rieske-Kinney adjourned the meeting at 6:02 PM.

Minutes of the Awards Banquet
Thursday, July 23, 2022

Lexington Marriott City Center
Lexington, Kentucky

Chair Lynne Rieske-Kinney called the awards ceremony to order at 8:04 PM.

SFIWC 2024 – Potential locations for the 2024 meeting were suggested. Jess Hartshorn offered to host in Greenville, South Carolina. Allen Smith offered Fort Worth, Texas. The membership voted and chose Greenville. The Executive Committee will begin looking at hotels in the area.

Photo Salon – Tom Sheehan stated that 65 photos and 6 videos were submitted this year from 16 members, whom he thanked along with fellow judges: Ron Billings and Paul Merten. He announced the 1st Place winners in each category, as well as the Best in Show winner, Bud Mayfield (see attached). Bud received $50, and his picture will be featured on the cover of the SFIWC 2023 program. Pictures will be forwarded to the Bugwood website.

Graduate Student Presentation Awards – Elizabeth McCarty, Graduate Student Session Coordinator, presented the 1st Place award (tie) and $300 to **Morgan Knutsen**, an M.S. student of Lynne Rieske-Kinney at University of Kentucky, and **Mary Wallace**, a Ph.D. student of Lynne Rieske-Kinney at University of Kentucky. Elizabeth thanked the students and four judges: Bob Coulson, Demian Gomez, Kier Klepzig, and Ashley Schulz.

Roger F. Anderson Award – Scott Salom, Chair, thanked committee members, Kamal Gandhi, Jess Hartshorn, Robert Jetton, and John Riggins. He announced that **Flávia Pampolini**, a Ph.D. student of Lynne Rieske-Kinney at University of Kentucky, received the 2022 award. Flávia was presented a check for $300; her personalized award plaque will be mailed to her in a few weeks.

A.D. Hopkins Award – Lynne Rieske-Kinney, Chair, thanked committee members, Chandler Barton, Lori Chamberlin, Kier Klepzig, Kelly Oten, Scott Salom, and JT Vogt. She reported that this year's winner is **Brian Sullivan**, USDA Forest Service. Lynne presented Brian with the A.D. Hopkins framed picture and letter. A personalized award plaque will be presented to Brian at the 2023 SFIWC.

Chair Rieske-Kinney adjourned the awards ceremony at 8:20 PM.

Respectfully submitted,

William P. Shepherd, Secretary-Treasurer

SFIWC Financial Report, CY 2022

SFIWC Income & Expenditures

January 1, 2022 – December 31, 2022

Balance on hand, 1/1/22	$4,620.33
Income	
Registrations, Donations, and Banquet fees	$32,222.35
Available Funds	$36,842.68
Expenses	
2022 Meeting	$31,207.02
Awards & Administration	$1,050.00
Total Expenses	$32,257.02
Balance on hand, 12/31/22	$4,585.66

Historians Report
7th NAFIWC
Virtual

Due to the COVID-19 pandemic, there was no Southern Forest Insect Work Conference held during the year 2020. This is the first time that the annual SFIWC was not held due to something other than the North American Forest Insect Work Conference. The year 2021 also heralds another "first" with the 7th NAFIWC being held "virtually" over a Zoom digital platform.

Of the 7 NAFIWCs held every 5 years since 1991, SFIWC meetings have been held in the same year only twice. The first time was the first NAFIWC held in Denver, Colorado when the 36th SFIWC was held in Orange Beach, Alabama. At that time, the impact of a competing entomology conference had not fully been realized. During the 3rd NAFIWC held in 2001 in Edmonton Canada, SFIWC was also held in Jekyll Island, Georgia. This year it was felt that the ability of SFIWC members to attend an international conference would be minimal. In order to support NAFIWC's success, the Executive Committee and members of SFIWC elected to cease having SFIWCs during NAFIWC years.

Prepared by Paul Merten SFIWC Historian

Historians Report
61st SFIWC
Lexington, Kentucky

This report is for the 61st Southern Forest Insect Work Conference held in Lexington, Kentucky. Unbelievably, this is only the second time since the inception of SFIWC back in 1956 that the conference has been held in the Bluegrass State. The 24th annual meeting in 1979, 43 years ago, was also held in Lexington.

The 1979 meeting was led by chairman Gerry Hertel and the program chair was Roy Hedden. Officers that year were Secretary/treasurer Fred Hain, and counselors J.C. Nord, John Foltz, and Wayne Berisford. The meeting was a large group with 116 people registered including: 39 federal, 28 state, 26 university faculty, 16 students and 7 industry. The keynote speaker was Stanley Barras from USDA-Forest Service Forest Insect and Disease Research in Washington, D.C. Mr. Barras spoke about the newly minted Regional and National Planning Committee which identified the following objectives: 1) more effective use of available resources, 2) identifying emerging problems of national and regional significance and directing resources to the solution of high priority problems, and 3) increasing the integration of efforts among participants in the system and avoiding unnecessary duplication. The 1979 meeting didn't have a designated theme but addressed a wide variety of topic workshops including:

- Reproduction weevils
- Cost benefit analysis of forest insect control
- Pine tree resistance to bark beetles
- New developments in elm bark beetle research
- Photography of forest insects
- Population dynamics of forest insects at low levels
- Pheromones of forest lepidoptera
- Problems in Forest management technology transfer
- Techniques for rearing sub-cortical insects
- Seed orchard management

For temporal context, below are some of the pop culture and issues occurring in the year of 1979:

- Three mile island partial meltdown nuclear accident
- China institutes the one child per family rule
- Pink Floyd release of "The Wall" album
- USSR invades Afghanistan
- Sony releases the Walkman
- Snowboard was invented
- Sixty-three Americans were taken hostage at the American embassy in Tehran, Iran
- World instability led gasoline prices to surge to an unprecedented 86 cents per gallon
- Minimum wage was $2.90 per hour

- Eleven people were crushed to death during a crowd surge for unreserved seats outside the Cincinnati Riverfront Coliseum prior to the concert by The Who
- The McDonalds Happy Meal first went on sale for $1
- Hurricanes were named after both men's and women's names
- Popular quote "I love the smell of napalm in the morning" – Robert Duval in the movie "Apocalypse Now"

Much has changed in the field of entomology in the last 43 years. Today there is little research conducted on pine tip moths, seed and cone orchard pests, or reproduction weevils as industrial forestry has declined precipitously in the southeastern United States. Today Dutch elm disease is rarely encountered or discussed so the importance of elm bark beetles has also waned. In general, much of the great work conducted on basic pine bark beetle biology and ecology in the past has evolved to sophisticated chemical ecology, gene silencing and silvicultural prevention. The efforts in entomology back in 1979 for the most part focused on native insect pest whereas today most research focuses on non-native invasive insects. Back then, pests like Hemlock Wooly Adelgid, Asian Longhorned Beetle, Emerald Ash Borer, and Laurel Wilt were unknown in the sphere of forest entomology. Some things; however, are still the same such as the quest to spread thin resources, coordinate research efforts, investigate pesticide efficacy and environmental fate, and the need to take decent digital images in our fast-paced digital world. Imagine what we will be researching 43 years from today.

Prepared by Paul Merten SFIWC Historian; June 16, 2022

Photo Salon Awards
2022 SFIWC – Lexington, Kentucky
Brittany Barnes & Tom Sheehan, Organizers

Forest Insect
1st Place Bud Mayfield – Female eastern tiger swallowtail, male pipevine swallowtail, and male Diana fritillary on milkweed, Jefferson National Forest, VA

Forest Insect Damage
1st Place Brittany Barnes – Lightning strikes again!

Series
1st Place Joe Pase – *Eumenes faternus*, potter wasp

Other
1st Place Bud Mayfield – Autumn foliage in the southern Appalachian Mountains, Blue Ridge Parkway, NC

Entomologists or Forest Health Specialists at Work
1st Place Bud Mayfield – Kevin Chase and Katy Crout examine sassafras roots excavated using an air spade on the Clemson University Forest, SC

Video
1st Place Katlin DeWitt – Swattin' SLF

Best in Show Bud Mayfield – Female eastern tiger swallowtail, male pipevine swallowtail, and male Diana fritillary on milkweed, Jefferson National Forest, VA

Judges: Ron Billings, Paul Merten, and Tom Sheehan

Officers and Committees – 2019-2022

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R. F. ANDERSON AWARD

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GRADUATE STUDENT SESSION

Elizabeth McCarty, University of Georgia, Warnell School of Forestry & Natural Resources, 2360 Rainwater Rd., Tifton GA 31793. 229-386-3078. Email ebenton@uga.edu

61st Conference, June 21-23, 2022
Lexington, Kentucky

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GRADUATE STUDENT SESSION

Ashley Schulz, Mississippi State University, Dept. of Forestry, Thompson Hall, Box 9681, Mississippi State MS 39762. 662-325-5809. Email ash.schulz@msstate.edu

62nd Conference, July 25-27, 2023
Raleigh, North Carolina

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