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SFIWC Chair: Lynne Rieske-Kinney

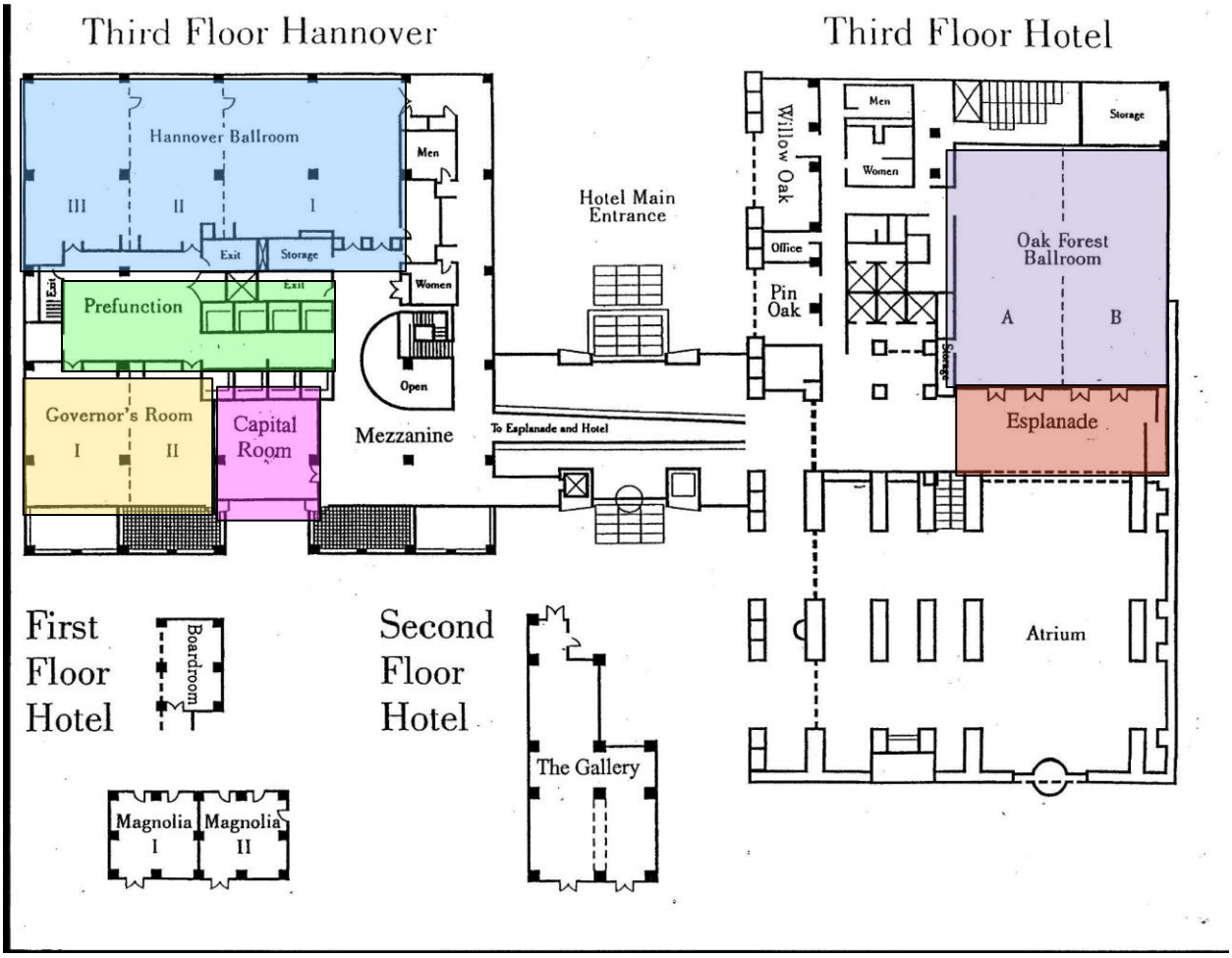
Local Arrangements: Robert Jetton and Kelly Oten

Will Shepherd, Secretary-Treasurer

62nd SFIWC Program Summary

Day/Time	Session Title	Location
Tuesday, July 25th		
8:00 – 10:00 AM	Meeting Registration	Esplanade
8:00 – 9:30 AM	Southern Pine Beetle (SPB) Working Group	Oak Forest A
9:00 – 10:00 AM	Roger F. Anderson Award Committee Meeting	Governor's I
10:00 - 11:00 AM	A.D. Hopkins Award Committee Meeting	Governor's I
11:00 - 12:00 PM	Southeast Needle Blight Working Group	Oak Forest A
	Executive Committee Meeting	Governor's I
12:00 – 1:00 PM	Lunch	
1:00-1:15 PM	Welcome Address	Oak Forest A
1:15 – 2:00 PM	Opening Business Meeting	Oak Forest A
2:00 – 2:30 PM	Keynote Address	Oak Forest A
2:30 – 3:30 PM	Plenary Session 1 & 2	Oak Forest A
3:30 – 4:15 PM	Break and Group Photos	Esplanade
4:15 – 5:00 PM	A.D. Hopkins Award Presentation	Oak Forest A
5:30 – 6:00 PM	Poster Set-up	Oak Forest B
6:00 – 8:00 PM	Mixer and Reception	Esplanade
8:00 - ????	Blacklight insect collecting	Lake Raleigh
Wednesday, July 26th		
8:00 AM – 6:00 PM	Meeting Registration	Esplanade
8:30 – 10:00 AM	Graduate Student Session I	Oak Forest A
10:00 – 10:30 AM	Break	
10:30 – 12:00 PM	Graduate Student Session II	Oak Forest A
12:00 - 1:00 PM	Lunch on your own	
1:00 - 3:00 PM	Field Trip	Nature Research Center
1:30 - 4:00 PM	Frustrana Cup	Raleigh Beer Garden
6:00 – 8:00 PM	Poster Session and Reception	Oak Forest B
Thursday, July 27th		
8:30 – 10:00 AM	Concurrent Session 1	
	Invasive forest pests, forest health, and forest genetics	Governor's I
	It takes two - updates on diseases associated with insects in the Southeast	Oak Forest A
10:00 – 10:30 AM	Break	
10:30 – 12:00 PM	Concurrent Session 2	
	State Cooperators Session	Governor's I
	Use of remote sensing in forest health and invasive species	Oak Forest A
12:00 – 1:30 PM	Lunch on your own	
Thursday, July 27th		

1:30 – 3:00 PM	**Concurrent Session 3**	
	The good, the bug, and the not-so-ugly: beneficial insects in forests I	**Governor's I**
	Forest health metrics and indicators	**Oak Forest A**
3:00 – 3:30 PM	**Break**	
3:30 – 5:00 PM	**Concurrent Session 4**	
	The good, the bug, and the not-so-ugly: beneficial insects in forests II	**Governor's I**
	Open Session	**Oak Forest A**
5:00 – 6:00 PM	**Closing Business Meeting**	**Oak Forest A**
7:00 - 9:00 PM	**Banquet**	**Hannover I & II**
	Insect Photo Salon	
	Graduate Student Presentation Awards	
	Roger F. Anderson Award	
	A.D. Hopkins Award	



Sheraton Raleigh Hotel Floor Plan

62nd Annual Southern Forest Insect Work Conference Program

July 25-27, 2023 | Raleigh, NC

Tuesday, July 25th — **Location**

8:00 – 10:00 Meeting Registration — **Esplanade**
Organizer: *Will Shepherd, USDA-FS-SRS*

8:00 – 9:30 Southern Pine Beetle Working Group — **Oak Forest A**
Organizer: *John Nowak, USDA-FS-FHP*

- **Introduction** - John Nowak, USFS, Asheville, NC
- **Current Status of SPB Pineville Field Office Zone/Asheville Field Office Zone -** Jim Meeker/ Paul Merten, USFS
- **Current Research Topics on SPB -** Brian Sullivan, USFS
- **SPB Prediction Model Updates** - Matt Ayres and Carissa Aoki, Dartmouth College
- **SPB Prevention Program in Florida** - Jeff Eickwort, FLDACS
- **When does prescribed burn reduce Southern pine beetle (*Dendroctonus frontalis* Zimmermann) spot incidence? A case study from the Bienville and Homochitto National Forests in Mississippi.** Chris Kuetsinya, Manoj Pandey, Jess McKenny, Jim Meeker, Chris Steiner, Tim Scholwalter, T.D. Johnson (Presenting).

9:00 – 10:00 Roger F. Anderson Award Committee
Governor's I
Organizer: *Lynne Rieske-Kinney, University of Kentucky*

10:00 – 11:00 A.D. Hopkins Award Committee — **Governor's I**
Organizer: *Stephen Clarke, USFS (Retired)*

10:45 - 12:00 Southeast Needle Blight Working Group — **Oak Forest A**
Organizer: *John Riggins, Mississippi State University*

11:00 – 12:00 Executive Committee Meeting — **Governor's I**
Organizer: *Lynne Rieske-Kinney, University of Kentucky*

12:00 – 1:00 LUNCH

1:00 – 1:15 Welcome Address — **Oak Forest A**
Presenter: *NC Senator Sydney Batch*

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

2:00 – 2:30 Keynote Address **Oak Forest A**
Ghost forests as symbols of climate change and resilience, Marcelo Ardón, *North Carolina State University*

2:30 – 3:00 Plenary Session I **Oak Forest A**
What is Forest Health? *Andrew Tait*, *Co-Executive/Forestry Director, EcoForesters*

3:00 - 3:30 Plenary Session II **Oak Forest A**
Forest Health: It takes a village. *Lori Chamberlin, Forest Health Program Manager, VA Dept of Forestry*

3:30 – 4:15 BREAK / GROUP PHOTOS **Esplanade**

4:15 – 5:00 AD Hopkins Presentation **Oak Forest A**
A privileged first observer of marvelous things. *Brian Sullivan, US Forest Service*

5:30 – 6:00 Poster Set-up **Oak Forest B**
Organizer: *Forest Palmer, Clemson University*

6:00 – 7:00 Mixer and Reception **Esplanade**

8:00 - 11:00 Insect Light Sheeting **Lake Raleigh**
Organizers: *Tom Sheehan, Jones Center at Ichauway; Michelle Kirchner, NCSU*
Please contact Tom at 630-430-8645 if you are interested in attending

Wednesday, July 26th **Location**

8:00 – 8:30 Meeting Registration **Esplanade**
Organizer: *Will Shepherd, USDA-FS-SRS*

8:30 – 10:00 Graduate Student Session **Oak Forest A**
Organizers: *Ashley Schulz, Mississippi State University; Kristin Hilborn, North Carolina State University; Damilola Taiwo, Mississippi State University; Prabina Sharma, Clemson University*

- **Preserving the spice: Determining the insect diversity and community composition of northern spicebush.** Matthew Longmire (Ph.D.),[1,4] 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; [3]USDA - Forest Service, Asheville, NC.

A native shrub with ecological and cultural significance, Lindera benzoin (L.) Blume (northern spicebush), is currently in danger due to laurel wilt (LW), a fungal disease caused by an invasive pathogen, *Harringtonia lauricola* sp. nov. This pathogen has spread across the southeastern U.S. for two decades on several species of Lauraceae. Recently, spicebush was confirmed to be susceptible to LW in a natural setting in several states, including Tennessee. Two dozen counties across Tennessee have been confirmed to have LW, including several in East Tennessee. While these infections have been primarily found on sassafras, there is concern that LW will begin infecting spicebush in areas where these two laurel species overlap as LW continues to spread throughout the state. It is unclear what impact the loss of spicebush may have, especially as it relates to insect communities. Few studies have focused on how LW will influence Tennessee forests, and there is no comprehensive study of insects associated with spicebush. Some species, such as larvae of *Papilio troilus* L. (spicebush swallowtails), feed almost exclusively on spicebush or sassafras. Other insects may also exhibit a specialized dependence on spicebush. Because no treatment for LW currently exists, it has the potential to spread throughout the native range of spicebush. If spicebush is lost due to LW, it is critical to have basic knowledge of associated insects to gauge which species may become threatened, endangered, or even locally or regionally extinct. A multi-year study was initiated in East Tennessee designed to determine insect diversity and community composition on spicebush. So far, several observed native insect species, such as spicebush swallowtail and *Neolasioptera linderae* (a gall midge), were determined to rely on spicebush. While some species did not directly feed on spicebush, they were found to be dependent on spicebush for shelter. The spread of LW could result in the loss of these native species. Spicebush is important to the overall health and diversity of East Tennessee forests, especially to insect and bird communities. This research seeks to inform conservation efforts of native insects associated with spicebush.

- **Developing a comprehensive restoration plan for sites invaded by tree-of-heaven and treated with the biocontrol agent *Verticillium nonalfalfae.*** Timothy J. Shively (Ph.D.)[1], Jacob N. Barney[1], J. Leighton Reid[1], Anton B. Baudoin[1], Scott M. Salom[2], [1]Virginia Tech,

School of Plant and Environmental Sciences, Blacksburg, VA, [2]Virginia Tech, Department of Entomology, Blacksburg, VA.

Ailanthus altissima (tree-of-heaven, or TOH) is a widespread invasive tree that displaces native vegetation, decreases biodiversity, and provides habitat to the invasive insect *Lycorma delicatula* (spotted lanternfly). TOH is susceptible to the vascular wilt fungus *Verticillium nonalfalfae*, which has been petitioned for federal approval as a commercially available biological control agent. TOH is problematic in forests, disturbed areas, and edge habitats that are frequently occupied by several nonnative species, so using the bioherbicide to treat and remove only TOH may lead to proliferation of other invasive plants. Six TOH stands located around Virginia were treated with *V. nonalfalfae* in 2017, and six more sites were established in 2022 for continued study of the bioherbicide. TOH mortality was extensive over the five interim years following the 2017 treatment. Vegetative surveys were then conducted in both the treatment and control plots from 2017 in addition to the 2022 controls. In the understory, overall species richness decreased after treatment. More specifically, the richness of native herbaceous species was reduced by 29%, and their diversity declined by 34%. Meanwhile, nonnative woody species richness also decreased by 37%. Native tree seedlings saw a moderate decline in richness, but observations of nonnative trees in the understory were limited to TOH and a single instance of *Pyrus calleryana* (callery pear). Site-specific context will be important for treating and restoring sites invaded by TOH, and individual surveys that assess the number and prevalence of co-occurring species will be vital to successful implementation. Planting of aggressive or fast-growing native species along with mitigation of invasive herbaceous species may be necessary to achieve a holistic approach. Future work will focus on comparing natural regeneration to an active restoration treatment that was installed in 2023 to develop practical guidelines for managing TOH with the bioherbicide and returning sites to a native plant community.

- **Exploring RNAi-mediated disruption of olfaction for suppressing *Ips calligraphus* populations.** Mary Wallace (Ph.D.) and Lynne K. Rieske. Department of Entomology, University of Kentucky.

Like other bark beetles, *Ips calligraphus* exploits disturbance conditions like droughts and storms to rapidly expand its population. This relies in part on their ability to use pheromones and host volatiles to initiate mass attacks on individual trees, overwhelming host defenses and leading to increasingly significant pine mortality. To mitigate the growing severity of these outbreaks, novel technologies like RNA interference (RNAi) are being explored to augment traditional IPM strategies. Our previous work successfully triggered the RNAi pathway in *I. calligraphus*, resulting in significant mortality. However, the versatility of RNAi technology enables the targeting of other genes, potentially allowing for the disruption of those involved in the chemical communication underlying mass attacks. In this study, we sequenced and assembled a de novo head transcriptome for pooled male and female *I. calligraphus* adults, then annotated chemosensory genes based on homology to insect entries in the NCBI GenBank database. The transcriptome analysis annotated previously unidentified chemosensory genes in *I. calligraphus*, including 53 olfactory receptors, 21 gustatory receptors, 50 ionotropic receptors, 31 odorant-binding proteins, 5 chemosensory proteins, and 9 sensory neuron membrane proteins. Through additional analyses we were able to classify certain proteins into subclasses and characterize features such as the completeness of the open reading frame and sequence similarity to other scolytines. Furthermore, we identified homologs of olfactory

receptors that have previously demonstrated responsiveness to Ips-specific odorants (ipsdienol and ipsenol) in the congeneric species *I. typographus*. Ongoing work is focused on using exogenous dsRNA to knockdown the odorant receptor co-receptor (Orco), one of the most conserved chemosensory genes integral to insect olfaction. Adult beetles will ingest dsRNA specifically designed to target Orco mRNA, and will then be assessed for changes in gene expression using quantitative PCR, and response to odorants via electroantennography. Using RNAi to target genes involved in the olfactory response of *I. calligraphus* is a promising approach for incorporating gene silencing technology in future management tools. This work is critical to understanding the molecular basis of key sensory processes in *I. calligraphus*, and to assessing the feasibility of targeting these genes as RNAi-based pest management technologies continue to advance.

- **Optimizing trap type and deployment timing for monitoring baldcypress leafroller. Kristy** M. McAndrew (Ph.D.)[1], Brian T. Sullivan[2], and Samuel F. Ward[1]. [1]Mississippi State University Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology; [2]U.S. Forest Service, USDA, Southern Research Station, Pineville LA.

Forested wetlands are ecologically and economically important ecosystems that support diverse biota and provide a wide range of ecosystem services. Baldcypress leafroller (*Archips goyerana* Kruse) is a native pest that defoliates baldcypress (*Taxodium distichum* (L.) Rich.), a keystone species throughout forested wetlands of the southeastern United States. Outbreaks of baldcypress leafroller (BCLR) have been isolated to Louisiana, where they have caused reduced growth, crown dieback, and tree death. However, spatiotemporal analyses suggest outbreaks are expanding eastward towards Mississippi. Given the possibility of expanding outbreaks, it is important to understand the timing of insect activity, such as the duration of dispersal, and efficacy of different trap types to guide survey efforts. With the help of collaborators, we deployed paired traps, one UNI-trap and one delta trap, baited with synthetic BCLR sex pheromone at ten sites across Mississippi, Florida, Georgia, and North Carolina. We checked traps weekly and quantified (i) differences in number of insects caught per trap type and (ii) the growing degree-days accumulated at the onset, peak, and cessation of the flight period. We hope that optimizing trapping practices for BCLR will improve detection of endemic populations and help identify areas potentially at risk of experiencing outbreaks.

- **Assessing occurrence of *Harringtonia lauricola*, the causal agent of laurel wilt disease, in sassafras-associated insects.** Morgan Knutsen (Ph.D.) and Lynne K. Rieske. University of Kentucky, Department of Entomology.

Rapid globalization has led to an increase in trade and introduction of non-native species to novel areas. Introduced species can become invasive, causing significant tree mortality, and altering ecosystem function. When the invader in question consists of an endophagous insect-fungal pathogen complex, management difficulties are exacerbated. Laurel wilt disease (LWD) is a lethal vascular disease impacting species within the Lauraceae family, causing tree mortality throughout the southeastern United States. LWD is caused by *Harringtonia lauricola*, the fungal symbiont of the exotic redbay ambrosia beetle (*Xyleborus glabratus* Eichoff) (RAB), which carries fungal propagules phoretically on the exoskeleton or internally in mycangia. LWD continues to spread into new northern and western regions utilizing additional hosts including sassafras (*Sassafras albidum*) and spicebush (*Lindera benzoin*). Previous studies in avocado (*Persea americana*) have shown phoretic

transport of *H. lauricola* by ambrosia beetle species other than RAB. My objective was to evaluate the presence of *H. lauricola* in insect associates. Working in sassafras forests at the leading edge of the LWD range expansion, I collected insects and evaluated them for internal and phoretic presence of *H. lauricola*. Infected bolts were placed into emergence bins and monitored daily for insect emergence for 2 months. All insects that emerged from laurel-wilt infected sassafras were collected and identified to order. Insects that emerged with ≥ 5 individuals were evaluated for phoretic and internal presence of *H. lauricola* propagules, including hidden snout weevils (*Apteromechus ferrartus*) (n=24), Eastern subterranean termites (*Reticulitermes flavipes*) (n=10), granulate ambrosia beetles (*Xylosandrus crassiusculus*) (n=8), and thread-waisted ants (*Aphaenogaster rudis*) (n=6). Once growth of *H. lauricola* was observed on agar plates, I verified fungal identity by extracting DNA and performing gel electrophoresis using taxon-specific microsatellite primers. Out of all individuals evaluated (N=24), I found internal presence of *H. lauricola* in one weevil and two granulate ambrosia beetles showing that insects other than RAB can potentially serve as vectors of LWD. My results are important because they provide a greater understanding of the interactions that are occurring within laurel wilt infected sassafras, which will ultimately help us develop management methods to reduce the spread of this invasive complex.

- **How does prescribed fire and salvage logging impact bark and woodboring beetles one-year after a catastrophic hurricane?** Benjamin M. Gochnour (Ph.D.)[1], Kamal J.K. Gandhi[1], Kier D. Klepzig[2], Thomas N. Sheehan[2], Chelsea N. Miller[3]. [1]D.B. Warnell School of Forestry and Natural Resources, University of Georgia, 180 E Green Street, Athens, GA 30602, USA; [2]The Jones Center at Ichauway, 3988 Jones Center Drive, Newton, GA 39870, USA; [3]Holden Forest and Gardens, Kirtland, OH, USA.

Climate change is increasing the intensity and hence, the severity of Atlantic hurricanes in forested ecosystems. These storms act as forest disturbance agents, with implications for the population dynamics of bark beetles and other wood colonizing insects. Windstorms have been shown to play a role in bark beetle outbreak events, where populations levels allow beetles to begin killing healthy trees. Longleaf pine (*Pinus palustris* Miller) trees are generally more resistant to bark beetle outbreaks than other southeastern pine species. This may be due in part to the defensive characteristics of individual trees and, at the stand level, the open canopy structure of frequent fire longleaf pine woodlands may lead to lower impacts from high winds, and lower attack rates by bark beetles. Our objective was to evaluate the effect of management practices including prescribed fire and salvage logging on bark and woodboring beetles in longleaf pine stands during the first year after catastrophic Hurricane Michael in southwestern Georgia. We used funnel traps and cross-vane traps baited with a combination of (+/-) ipsenol, *cis*-verbenol, and (+/-) ipsdienol, or ultra-high release ethyl alcohol and Sirex blend (70% alpha-pinene and 30% beta-pinene) respectively, to compare catches of three native *Ips* species (*Ips calligraphus*, *I. grandicollis*, and *I. avulsus*) as well as the associated woodboring beetle (Coleoptera: Cerabycidae) community. Treatments included prescribed fire and salvage logging, prescribed fire and no salvage logging, and no prescribed fire and no salvage logging. *Ips calligraphus* and *I. avulsus* trap catches increased with increasing implementation of management practices. *Ips grandicollis* showed no clear pattern related to increasing disturbance from management practices. Differences in *Ips* beetle trap caches between the treatments were statistically significant, although that may not translate to

biological significance. Woodboring beetle communities did not differ significantly between treatments. The lack of treatment effects from management practices post wind disturbance may be attributed to the resilience of longleaf pine ecosystems. Longleaf pine's natural resistance to both wind disturbance and bark beetle outbreak may obviate the need for specific management techniques to suppress bark beetle outbreaks after windstorms.

- **The Life of *Leucotaraxis argenticollis* in the eastern US.** Carrie E Preston (Ph.D.)[1], Nicholas J. Dietschler[2], Mark C Whitmore[3], and Scott M Salom[1], [1]Department of Entomology, College of Agriculture and Life Sciences, Virginia Tech, 170 Drillfield Dr. Blacksburg, VA 24061, USA, [2] Department of Ecology and Evolutionary Biology, College of Arts and Sciences, Cornell University, E145 Corson Hall, Ithaca, NY 14853, USA, [3] Department of Natural Resources and the Environment, College of Arts and Sciences, Cornell University, 106 Fernow Hall, Ithaca, NY 14853, USA.

Leucotaraxis argenticollis (Diptera: Chamaemyiidae) is one of two *Leucotaraxis* species being released for biological control of hemlock woolly adelgid (HWA) in the eastern US. To understand how better to time its release, we studied the phenology of the western strain of *L. argenticollis* in relation to HWA phenology at field sites in Ithaca, New York and Bland, Virginia in 2021 and Virginia only in 2022. In 2021, 30 mesh cages were placed over HWA-infested eastern hemlock branches at both sites. When HWA sistens started egg production, ten (5M:5F) *L. argenticollis* adults were released into the cages. Biweekly sampling occurred from March – July and monthly sampling occurred from August – September to document the life stages of *L. argenticollis* and HWA. Branch dissections revealed that *L. argenticollis* eggs were present when HWA sistens eggs and progrediens eggs were present at both field sites. *Leucotaraxis argenticollis* eggs were also found in August when aestivating sistens were present in NY, whereas eggs were not found at this time in VA. Larvae were first observed on March 12th in VA and on April 27th in NY. Once puparia were observed on April 9th in VA and on May 25th in NY, they were consistently found throughout the remaining sampling dates for both sites. In 2022, 19 cages were employed at the Bland, VA site only, due to high HWA winter mortality at the Ithaca site in NY. Seven (3M:4F) *L. argenticollis* adults were released into the cages when HWA sistens started egg production. Biweekly sampling occurred from March – July and monthly sampling occurred from August – March. *Leucotaraxis argenticollis* eggs were present when HWA sistens eggs and progrediens eggs were present, similar to what was observed in 2021. Larvae were first observed on April 4th, which was three weeks later compared to 2021. Also as in the previous year, once puparia were first observed (May 2nd), they were consistently found throughout the remaining sampling dates. This study presents evidence that the phenology of the western strain of *L. argenticollis* synchronizes well with HWA phenology, improving the prospects of it being able to establish in the East.

10:00 – 10:30 BREAK

10:30 – 12:00 Graduate Student Session cont'd **Oak Forest A**

Organizers: *Ashley Schulz, Mississippi State University; Kristin Hilborn, North Carolina State University; Damilola Taiwo, Mississippi State University; Prabina Sharma, Clemson University*

- **Assessing emerald ash borer phenology to optimize parasitoid releases in North Carolina.** Courtney Smith Johnson (Ph.D.)[1], G. Ryan Bohannon[2], Dr. Robert Jetton[1], and Dr. Kelly Oten[1], [1]NC State University, Raleigh, NC, [2]Clemson University, Clemson, SC.

The emerald ash borer (EAB), *Agrilus planipennis*, is a major threat to ash trees in North America. First discovered in North Carolina in 2013, the pest has now spread to over 60 counties in the state. Parasitoid wasps are a major component of the management efforts of this forest pest, but their establishment in the South has been limited. To optimize releases of these biological control agents, we assessed the phenology of EAB in central North Carolina from 2019 to 2021. Results indicated that EAB is univoltine in central North Carolina, making *Spathius agrili* the most suitable parasitoid for the region with optimal releases likely to occur from mid-to-late June to late August. However, while EAB is univoltine in central NC, models suggest that the climate of western NC may yield semivoltine EAB, changing parasitoid release recommendations. *Testrastichus planipennisi* and *Spathius galinae* are more suitable for regions with semivoltine EAB where mature EAB larvae are available when *T. planipennisi* and *S. galinae* emerge in spring. As such, we confirmed these models by sampling EAB in western NC and eastern TN to assess overwintering life stages. At four research sites, overwintering EAB specimens were collected which aligned with models' suggestions. As a result, releases of *Tetrastichus planipennisi* and *Spathius galinae* have begun at sites in western NC and will be monitored for establishment.

- **Emerging technologies for conifer tree protection against southern pine beetle.** Zachary Bragg (Ph.D.) and Lynne K. Rieske. Department of Entomology, University of Kentucky.

RNA-interference (RNAi) is a natural process that defends against viral attack, however, when manipulated with engineered double-stranded RNA (dsRNA) this pathway can induce potent gene-specific silencing in insects. Coleopterans, including the mountain and southern pine beetles (*Dendroctonus ponderosae*, Hopkins and *D. frontalis*, Zimmerman), are especially susceptible to orally ingested dsRNA. As concerns persist over pesticide safety and environmental contamination, protecting high value trees or plantations from insect pest attack will likely include hostplant delivered biopesticides, therefore a better understanding of the within-plant behavior of dsRNAs is necessary. Previous work in loblolly pine (*Pinus taeda*, L.) demonstrated that dsRNAs applied as a hydroponic root soak move rapidly and systemically throughout the plant, but plant response to insect-specific dsRNA on a molecular level remains unknown. To investigate, loblolly pine seedlings were treated with southern pine beetle-specific dsRNA, and mRNA was sequenced (N = 4), transcriptomes were assembled, and key genes were annotated and analyzed for differences in gene expression. Fourteen RNAi-related proteins were annotated from the loblolly transcriptome, however, expression analysis showed that none of these transcripts were differentially expressed in treated seedlings. However, there were thousands of differentially expressed transcripts between treated and untreated seedlings, with the greatest abundance of orthologs categorized under 'replication and repair of nucleic acids.' Pathway enrichment revealed differential expression of multiple metabolic and information processing pathways including those related to defense and stress response. The lack of observed RNAi response could be explained by limitations of sampling technique, a localized or ephemeral RNAi response, or a separation of dsRNA from RNAi machinery in-planta. Therefore, future work investigating the various interactions dsRNAs experience within plant tissue will be necessary for developing formulations and products to enhance delivery. With

future work increasing the stability and uptake, RNAi based products could represent a powerful pest management tool for single tree protection. My work is important because it lays the groundwork for understanding the cross-kingdom effects of RNAi and moves us closer to integrating this technology into existing management plans, bolstering our trees for a healthier tomorrow.

- **Impacts of habitat fragmentation on southern pine beetle infestation in the Homochitto National Forest, Mississippi, USA.** Damilola M. Taiwo (M.S.)[1], Adam D. Polinko[1], John J. Riggins[2], and Ashley N. Schulz[1]. [1]Mississippi State University, Department of Forestry; [2]Mississippi State University, Department of Biochemistry, Molecular Biology, Entomology, and Plant Pathology.

Southern pine beetle (*Dendroctonus frontalis*) is a native forest insect pest with a long history of destruction in the southeastern United States. However, in the last couple of decades, outbreak activity has significantly declined. Reasons for this decrease are unknown, though it has been hypothesized that fragmentation of suitable habitat (i.e., overstocked and unimproved pine stands) may be a contributing factor. Here, we tested this hypothesis and estimated how habitat fragmentation affects southern pine beetle infestation. We focused on the Homochitto National Forest in southwestern Mississippi because it has experienced southern pine beetle infestation in the last ten years. We conducted a GIS analysis where each southern pine beetle spot was assigned a 100 m buffer radius to determine the fragmentation within the spots. The land use land cover classifications of the 2012, 2015, 2017, and 2019 southern pine beetle spots were derived from the National Land Cover Database and processed through fragmentation analysis (FRAGSTAT) at the class and landscape levels. To select the best class level landscape metric that described the southern pine beetle infestation, an ordinary least square forward selection was employed at an $\alpha = 0.05$ significance level. Our preliminary results demonstrate that years 2017 and 2012 had the most abundant southern pine beetle infestations, and evergreen forest had the highest percentage of land cover within each spot across the four consecutive years, ranging from 53.3% to 75.9%. Based on the landscape level metrics, the Shannon Diversity Index demonstrated more species diversity within the spots in 2012 than the remaining years, while the year 2017 had the lowest species diversity. We found that total patch area (ha), year of infestation, and Euclidean nearest neighbor mean (m) were found to be weak but significant drivers impacting southern pine beetle infestation in the Homochitto National Forest. Though further analyses will be necessary, these results demonstrate that southern pine beetle infestation may be lessened in fragmented versus highly connected pine forest.

- **Assessing release and recovery methods for *Leucotaraxis* spp., predators of hemlock woolly adelgid.** Olivia Andrews (Ph.D.)[1], Scotty Yang[1], Albert Mayfield[2], Mark Whitmore[3], and Scott Salom[1]. [1]Virginia Tech Entomology Department; [2]USDA-FS, and [3]Cornell University.

In the last decade, rearing and release of predators for hemlock woolly adelgid, *Adelges tsugae* Annand (Hemiptera: Adelgidae) has focused on two *Laricobius* spp. (Coleoptera: Derodontidae). More recently, two species of *Leucotaraxis* flies (Diptera: Chamaemyiidae) have also been studied and released. They are present during the second generation of HWA (in the spring) when *Laricobius* spp. drop to the soil to complete development, and thus, have the potential to help

regulate HWA populations in combination with the *Laricobius* beetles. Releases of *Leucotaraxis* spp. since 2015 have resulted in only one confirmed recovery past the F1 generation. With continued release of these predators into the environment we are monitoring populations for establishment. Caged releases of *Leucotaraxis* spp. were performed in the spring of 2022 at eight sites in both Virginia and Maryland. Three treatments with different release timings and fly species (*Leucotaraxis argenticollis* and *Leucotaraxis pinperda*) were randomly assigned to these eight sites. Monthly samples were taken after the spring releases in 2022 until October to confirm *Leucotaraxis* spp. were able to reproduce successfully. Sites were then sampled bi-annually in the spring of 2023. The recovery of *Leucotaraxis* spp. at different life stages through one year post release will be utilized to determine the best release timing. Six additional sites in Virginia and Maryland were added and utilized for releases in the spring of 2023. Caged vs. open releases are currently being investigated to determine which method of release results in the best recovery.

- **Bugs hanging out in the canopy: A preliminary study of longleaf pine canopy arthropods.**
  N. Royce Dingley (M.S.)[1], Thomas N. Sheehan[2], Kier D. Klepzig[2], and Elizabeth McCarty[1]. [1]University of Georgia, [2]The Jones Center at Ichauway.

Longleaf pine communities once covered most of the Southeastern Coastal Plains. Now only approximately two percent of the original longleaf pine habitat remains. Gaining a greater understanding of an ecosystem home to many threatened species can provide important information to forest and land stewards. Canopy arthropods constitute an unknown network of ecological connections that, once studied, will expand current longleaf pine ecosystem knowledge. This pilot project was conducted at the Jones Center at Ichauway in Southwest Georgia, where we established plots in three longleaf pine-dominated ecological communities: flatwoods, upland forest, and fluvial terrace. In addition to documenting arthropods in this habitat, research questions include: (1) does total canopy arthropod trap catch vary among longleaf pine ecological community types? (2) does order-level arthropod trap catch vary among ecological communities? (3) does arthropod family-level richness vary among ecological communities? A flight intercept trap was placed in a longleaf pine tree at mid-canopy level at three sites in each ecological community (9 traps total). Traps were set for one week each month from May – August 2022. The ecological communities were the study treatments, while 'site' is the experimental unit. Total, order-level, and family-level abundance were analyzed using an ANOVA to determine if there was a difference among ecological communities ($P \leq 0.05$). During the 2022 collecting season 4004 arthropods from 13 orders were collected from the longleaf canopies. Diptera was the most prevalent taxon, comprising 34.3% of specimens. However, 21.8% of collected specimens were from the order Collembola. As a small-bodied and non-flying group of insects, it is intriguing that Collembola inhabit longleaf canopies in large numbers. Overall, hemipteran, coleopteran, dipteran, collembolan, and lepidopteran trap catch was similar among the ecological communities. Among the three orders identified to family-level (Coleoptera, Collembola, and Hemiptera), only Hemiptera differed in family-level richness. This study sets the stage for further canopy research in longleaf pine trees.

- **Examining park user's risk perceptions of emerald ash borer management tactics.** Mitchell Green (M.S.), Brittany F. Barnes, Kamal JK Gandhi, Elizabeth F. Pienaar. University of Georgia, Athens, GA.

Invasive insect pests such as the emerald ash borer (EAB) (*Agrilus planipennis*) cause widespread host tree mortality, and significant management efforts are required to reduce ecological impacts. However, stakeholder's risk perceptions of invasive species management tactics (i.e., biological control or chemical control) may be different than those of the managers leading to an aversion towards using them. Awareness and knowledge of EAB or attitudes towards ash (*Fraxinus* spp.) trees may also influence stakeholder support for management. This study examined park user's risk perceptions and support for EAB management through an intercept survey across four parks in northeastern Georgia. We received 174 surveys and completed ordinal logistic regression with support for either biological or chemical control as our dependent variables and measured constructs (i.e., awareness, knowledge, and risk perceptions) and demographic information as our dependent variables. After stepwise backwards regression to identify the best fit models, we found that risk perceptions negatively influenced support for chemical and biological control as management tactics. Individuals who were more concerned about EAB were more likely to support biological control but not chemical control. We also found that individuals who indicated that they use the parks to sit and enjoy nature were more likely to support biological control, while birdwatchers were less likely to support either of the control measures. Finally, individuals who expressed positive attitudes towards ash trees were the only group more likely to support chemical control. Our results suggest that stakeholder risk perceptions, recreation preferences, and attitude towards impacted trees may influence their levels of support for EAB management. Agencies or organizations that are managing EAB may thus choose to alter their messaging around invasive species management to better communicate and connect with their stakeholders.

- **The impact of soil applied imidacloprid on the subterranean survivorship of *Laricobius* spp. (Coleoptera: Derodontidae), a specialist predator of *Adelges tsugae* (Hemiptera: Adelgidae).** Ashleigh P. Hillen (M.S.)[1], Aaron D. Gross[1], Albert E. Mayfield III [2], Jeremiah R. Foley IV [3], Jacob Williams [4], Kang Xia [5], Scott M. Salom[1]. [1] Department of Entomology, Virginia Tech University, Blacksburg, VA; [2] USDA Forest Service, Southern Research Station, Asheville, NC; [3] USDA-ARS Invasive Plant Research Laboratory (IPRL), Ft. Lauderdale, FL; [4] Department of Statistics, Virginia Tech University, Blacksburg, VA; [5] Department of Plant and Environmental Sciences, Virginia Tech University, Blacksburg, VA.

The invasive hemlock woolly adelgid (HWA) *Adelges tsugae* (Annand) (Hemiptera: Adelgidae) has spread throughout most of the range of eastern hemlocks, *Tsuga canandensis* (L.) and the entire range of Carolina hemlocks, *Tsuga caroliniana* (Engelman). Integrated pest management (IPM) tactics for HWA combine chemical applications with the simultaneous release of biological control agents on untreated trees within the same stand. *Laricobius* spp. (Coleoptera: Derodontidae) have been used as biological control agents of HWA since 2003, occupying a subterranean and arboreal life phase synchronous with HWA. Within forests managed by IPM tactics, there is the potential for released *Laricobius* spp. to land on insecticide-treated trees and settle below the tree's drip line for the subterranean phase of its lifecycle. Imidacloprid is the most widely used insecticide for HWA management. It has been shown to persist in the soil for up to five years post-application, and along

with metabolites, has been found to negatively impact soil microarthropods. During the subterranean portion of their lifecycle (May-October), *Laricobius* adults undergo aestival diapause. There is limited knowledge of this portion of their life cycle and how imidacloprid and its metabolites impact their aestivation. Field investigations took place to assess the impact of historical and active imidacloprid soil treatments on the subterranean life phase of *Laricobius* spp. by quantifying imidacloprid and metabolite soil concentrations and percent adult emergence from the soil in the fall. This is the first study to document the effect of imidacloprid soil treatments on the subterranean survivorship of *Laricobius* spp. Based on this study, there is a significant treatment effect from soil drench imidacloprid applications on percent emergence and on the concentration of chemical residues at the topsoil and 1-5 cm depths ($P < 0.05$). From 2021 to 2022, there were above average field emergence rates from soil treated with imidacloprid soil injections that took place in 2020 (20.4 ± 4.7%) and 2017 (22.8 ± 2.5%). This study shows no significant negative impact of soil injection applications of imidacloprid on *Laricobius* spp. percent emergence, whether applied one or five years before aestivation takes place.

12:00 – 1:00 LUNCH

1:00 - 3:00 Field Trip

Organizers: Kelly Oten and Abby Ratcliff, NC State University
Nature Research Center, North Carolina Museum of Natural Sciences
11 West Jones Street, Raleigh, NC 27601
https://naturalsciences.org/exhibits/permanent-exhibits/nature-research-center

1:30 – 3:00 Frustrana Cup

Organizers: Kelly Oten and Abby Ratcliff, NC State University
Raleigh Beer Garden
614 Glenwood Ave, Raleigh, NC 27603
https://theraleighbeergarden.com/

6:00 – 8:00 Poster Session **Oak Forest B**

Organizer: Forest Palmer, Clemson University

Thursday, July 27th **Location**

8:30 – 10:00 Concurrent Session 1

Invasive forest pests, forest health, and forest genetics **Governor's I**
Moderators: *Robert Jetton and Fred Hain (retired), NC State University*

- **Genetic diversity, gene conservation, and risk management.** Robert Jetton, N.C. State University.
- **On the hunt for 'suspiciously healthy' trees: establishing a range-wide protocol to identify lingering hemlocks.** Margot Walston, NC Hemlock Restoration Initiative
- **Traditional breeding and genetic engineering for American chestnut restoration.** Vasiliy Lakoba, The American Chestnut Foundation.
- **Using genomic tools to better understand emerging needle diseases of loblolly pine.** Colton Meinecke, University of Georgia.

It takes two – updates on diseases associated with insects in the Southeast **Oak Forest A**
Moderators: *Kaitlin DeWitt, Virginia Department of Forestry and Caterina Villari, University of Georgia*

- **Secondary insects and facultative pathogens in disturbed pine forests.** Kier Klepzig[1], Crystal Bishop[1], Colton Meinecke[2], Tom Sheehan[1], and Caterina Villari[2], [1]Jones Center at Ichauway, [2]University of Georgia.
- **Host-pathogen-vector interactions in walnut, sassafras, and oak systems.** Hadziabdic-Guerry, Denita, University of Tennessee.
- **Managing eastern white pine diseases (foliar pathogens, *Caliciopsis canker*, white pine blister rust) and white pine weevil.** Munck, Isabel[1], Kara Costanza[2], Bill Livingston[3], Cameron McIntire[1], Jon Janelle[1], [1]USDA Forest Service, Durham NH, [2]USDA Forest Service, St. Paul, MN, [3]UMaine. [1]USDA Forest Service, Durham NH, [2]USDA Forest Service, St. Paul, MN, [3]UMaine.
- **Flash talk: Advancing diagnosis and surveillance for the oak wilt pathogen, *Bretziella fagacearum*, using LAMP.** Meinecke, Colton D.[1], Rhys A. Eshleman[1], Karandeep Chahal[2], Demian F. Gomez[3], Monique L. Sakalidis[2], Andrew Loyd[4], Caterina Villari[1], [1]University of Georgia, [2]Michigan State University, [3]Texas Forest Service, [4]Bartlett Tree Experts.
- **Flash talk: Gene Silencing provides a potential tool for managing redbay ambrosia beetle**. Morgan Knutsen and Lynne Rieske. University of Kentucky.

10:00 – 10:30 Break **Esplanade**

Thursday, July 27th **Location**

10:30 – 12:00 Concurrent Session 2

State Cooperators Session **Governor's I**
Moderators: *David Coyle, Clemson University and Kelly Oten, NC State University*

- **We should have zigged, but we zagged…elm zigzag sawfly's appearance in North Carolina.** Heath, Brian, North Carolina Forest Service.
- **The great South Carolina forest tent caterpillar outbreak of 2023: Remote-sensing reveals interesting distribution patterns.** David Jenkins,, South Carolina Forestry Commission.
- **Relámpago blight: A new and unusual tree pathogen discovered in Florida.** Jeff Eickwort[1], Claudia Paez[2], Hector Urbina[3] and Jason Smith[2], [1]Florida Forest Service, [2]University of Florida, [3]Florida Dept. of Agriculture and Consumer Service.
- **Legions of *Lymantria* – spongy moth in the Shenandoah Valley of Virginia.** KatlinDewitt, Virginia Department of Forestry.

Use of remote sensing in forest health and invasive species **Oak Forest A**
Moderators: *Jess Hartshorn, Clemson University*

- **Introduction to remote sensing in forest health.** Jess Hartshorn, Clemson University.
- **Interactive survey: Developing a decision-making tool for land managers to control invasive plants.** Jess Hartshorn, Clemson University
- **Multi- and hyper-spectral imagery in forest health monitoring and invasive plant detection.** Marina Lupu, Clemson University.
- **Use of drones in urban pest management detection.** David L. Kulhavy, Daniel R. Unger, I-Kuai-Hung, Yanli Zhang and Victoria Williams. Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, Texas.
- **Case study: use of remote sensing to detect and monitor invasive plants.** Jess Hartshorn, Clemson University
- **Group discussion.**

12:00 – 1:30 Lunch on your own

1:30 – 3:00 Concurrent Session 3

The good, the bug, and the not-so-ugly: beneficial insects in forests I **Governor's I**
Moderators: *Tom Sheehan and Christine Favorito, The Jones Center at Ichauway*

- **The good, the bug, and the not-so-ugly: Beneficial insects in forests: An overview.** Christine Favorito and Tom Sheehan, The Jones Center at Ichauway.
- **It's the end of the wood as we know it. Live!** Mike Ferro, Clemson University.
- **Fire, forests, and friends: Beneficial insects of longleaf pine.** Sheehan, Thomas N.[1], Christine M. Favorito[1], Kamal J.K. Gandhi[2], and Kier D. Klepzig[1], [1]The Jones Center at Ichauway, [2]D.B. Warnell School of Forestry and Natural Resources, University of Georgia
- **Condo or cuisine? The function of fine woody debris in driving decomposition, detritivores, and their predators.** Natalie Clay, [1], Nicholas Benedetto[1], and Craig McClain[2], [1]School of Biological Sciences, Louisiana Tech University, [2]Department of Biology, University of Louisiana-Lafayette.
- **Friends in high places: Arboreal ants of the southeastern Piedmont.** Michelle Kirchner, Clyde Sorenson, Elsa Youngsteadt, Department of Entomology and Plant Pathology and Department of Applied Ecology, North Carolina State University.
- **The frosted elfin butterfly: An umbrella species for southern Sandhills.** Robert T. Meyer, Tall Timbers Research Station, Tallahassee, FL

Forest Health Metrics and Indicators **Oak Forest A**
Moderators: *Chris Asaro, US Forest Service*

- **What do we mean by "forest health"?** Chris Asaro, USFS-FHP, Atlanta, GA.
- **Forest health indicators from other than the usual sources.** Frank Koch, USFS-SRS, RTP-Raleigh, NC.
- **National multi-scale assessments of forest regeneration: contrasting indicators for native and non-native trees.** Kevin Potter, USFS-SRS, RTP-Raleigh, NC.
- **Non-native invasive species and forest health.** Kelly Oten, NCSU, Raleigh, NC.

3:00 – 3:30 Break

3:30 – 5:00 Concurrent Session IV

The good, the bug, and the not-so-ugly: beneficial insects in forests II **Governor's I**
Moderators: *Tom Sheehan and Christine Favorito, The Jones Center at Ichauway*

- **It's good to know your friends - Venus flytraps avoid eating their pollinators.** Clyde Sorenson, Department of Entomology and Plant Pathology and Department of Applied Ecology, North Carolina State University.
- **Wild bee community responses to forest harvesting: Implications of the patchwork landscape.** Christine Fortuin, Forestry Department, Mississippi State University,
- **Understanding wild bee community composition at the urban-forest interface.** Miriam Edelkind-Vealey,[1], Michael D. Ulyshen[2], and S. Kristine Braman[1], [1]Department of Entomology, College of Agricultural and Environmental Sciences, University of Georgia, Athens, GA, USA, [2]United States Department of Agriculture (USDA) Forest Service, Southern Research Station, Athens, GA, USA.
- **Pollinators in forests and effects of herbicides.** Emma L. Briggs[1], Daniel U. Greene[2], Christine C. Fortuin[3], Brittany F. Barnes[1], Kamal J.K. Gandhi[1], [1]D.B. Warnell School of Forestry and Natural Resources, University of Georgia, [2]Weyerhaeuser Company, Environmental Research South, Columbus, MS, [3]Forestry Department, Mississippi State University.
- **Georgia Insect Conservation Alliance: Making connections, sharing resources, supporting conservation initiatives.** Meghan W. Hedeen, US Fish and Wildlife Service, Athens, GA,
- **Group discussion** (15 mins)

Open Session **Oak Forest A**
Moderators: *Greg Wiggins, North Carolina Department of Agriculture and Consumer Services, Todd Johnson, Louisiana State University, and Katy Crout, Clemson University*

- **CANCELED. Global analyses suggest that bridgeheads play critical roles in invasions by bark and ambrosia beetles.** Samuel F. Ward[1*], Eckehard G. Brockerhoff[2], Robert J. Rabaglia[3], Jiří Trombik[4], and Andrew M. Liebhold[4,5], [1]Department of Entomology, The Ohio State University, Columbus, OH, [2]Swiss Federal Research Institute WSL, Birmensdorf, Switzerland, [3]USDA Forest Service Forest Health Protection (Retired), Washington, DC, [4]Czech University of Life Sciences Prague, Faculty of Forestry and Wood Sciences, Czech Republic, [5]USDA Forest Service Northern Research Station, Morgantown, WV.
- **Progress in improving the selection and deployment of fusiform rust resistance in loblolly pine stands.** Simone Lim-Hing, Department of Plant Biology, University of Georgia.

- **Current forest health studies at Louisiana Tech University.** L. Sims,, Adams, J., Adams, H., Holley, G., Crosby, M., Huckaby, A., and Freeman, A. Louisiana Tech University, Forestry Program,

- **Optimization of a high-throughput screening protocol to assess resistance in loblolly pine families against brown spot needle blight.** Rhys Eshleman[1], Colton Meinecke[2], Katie McKeever[3], Caterina Villari[2], [1]Department of Plant Biology, University of Georgia, [2]Warnell School of Forestry and Natural Resources, University of Georgia, [3]Resistance Screening Center, USDA Forest Service.

- **Insect pollinators in the Piney Woods of east Texas.** Robert Coulson and James Tracy, Knowledge Engineering Laboratory, Department of Entomology, Texas A&M University.

- **It's a bird! It's a plane! Wait no, it is a Joro spider!** Brittany Barnes[1], Matt Elliott[2], Rhys Eshleman[1], Erin Grabarczyk[3], Colton Meinecke[1], Jason Schmidt [4], Caterina Villari[1], Rebekah Wallace[4] and Kamal Gandhi[1], [1]D.B. Warnell School of Forestry and Natural Resources, University of Georgia, [2]Georgia Department of Natural Resources, [3]Department of Biology, Valdosta State University, [4]Department of Entomology, University of Georgia.

5:00 – 6:00 **Closing Business Meeting** **Oak Forest A**

7:00 – 9:00 **Banquet – Hannover I & II**

Insect Photo Salon

Organizer: *Brittany Barnes, University of Georgia*

Graduate Student Presentation Awards

Roger F. Anderson Award

A.D. Hopkins Award

2023 SFIWC Posters - Oak Forest B

Organizer: Forest Palmer, Clemson University

1. **Coleopteran predators and fungivores associated with bark and woodboring beetles attracted to traps baited with ethanol and α-pinene in southern USA.** Daniel Miller, USDA-FS-SRS.

2. **Predators attracted to cerambycid pheromones in hardwood forests of southern USA.** Daniel Miller[1] and Jon Sweeney[2], USDA-FS-SRS[1] and Canadian Forest Service[2].

3. **Predators attracted to combination of bark beetle pheromones and host volatiles in pine forests of southeastern United States.** Daniel Miller[1], Chris Crowe[1] and Chris Asaro[2], USDA-FS-SRS[1] and USDA-FS-FHP[2].

4. **Trends in bark beetle impacts in North America during a period (2000–2020) of rapid environmental change.** Christopher J. Fettig[1], Christopher Asaro[2], John T. Nowak[2], Kevin J. Dodds[2], Kamal J.K. Gandhi[3], Jason E. Moan[4], and Jeanne Robert[5]. Pacific Southwest Research Station, USDA Forest Service[1], Forest Health Protection, USDA Forest Service[2], D.B. Warnell School of Forestry and Natural Resources, University of Georgia[3], Alaska Division of Forestry[4], and British Columbia Ministry of Forests, Lands, Natural Resource Operations and Rural Development[5].

5. **Biological control of hemlock woolly adelgid in North America: history, status, and outlook.** Albert E. Mayfield III[1], Tonya D. Bittner[2], Nicholas J. Dietschler[2], Joseph S. Elkinton[3], Nathan P. Havill[4], Melody A. Keena[4], David L. Mausel[5], James R. Rhea[6], Scott M. Salom[7], and Mark C. Whitmore[2]. [1]USDA Forest Service, Southern Research Station, Asheville, NC 28804, [2]Department of Natural Resources and Environment, New York State Hemlock Initiative, Cornell University, Ithaca, NY 14853, [3]Department of Environmental Conservation, University of Massachusetts, Amherst, MA 01003, [4]USDA Forest Service, Northern Research Station, Hamden, CT 06514, [5]USDA Forest Service, State and Private Forestry, Forest Health and Forest Markets, Eastern Region, Milwaukee, WI 53202, [6]USDA Forest Service, State and Private Forestry, Forest Health and Forest Markets, Southern Region, Asheville, NC 28804, [7]Department of Entomology, Virginia Tech, Blacksburg, VA 24061.

6. **Predators attracted to *Ips* pheromones ipsenol, ipsdienol and lanierone in the South.** Dan Miller[1], Chris Asaro[2], and Wayne Berisford[3], USDA-FS-SRS[1], USDA-FS-FHP[2] and University of Georgia[3].

7. **Eight years and counting: the impacts of a regional forest health education program.** Katy Crout[1], Molly Darr[2], and David Coyle[1], Clemson University[1] and Washington State University[2].

8. **The beetle racer wrecking the acer: The race against ALB in SC.** Crystal Bishop[1], Katy Crout[1], Meredith Bean[1], Marina Lupu[1], Abby Ratcliff[2], Lena Schmitt[1], Kelly Oten[2], and David Coyle[1], [1]Department of Forestry & Environmental Conservation, Clemson University, [2]Department of Forestry and Environmental Resource, University of North Carolina.

9. **Asian citrus psyllid and huanglongbing (HLB): Current status in the United States and in the state of South Carolina.** Predeesh Chandran and Xiao Yang, Clemson University.

10. **Exploring patterns of relatedness and genetic evidence of virulence in endemic populations of the pine pitch canker pathogen, *Fusarium circinatum*.** Colton D. Meinecke[1], Owen Hudson[2], Caterina Villari[1], Jeremy T. Brawner[2], [1]Warnell School of Forestry and Natural Resources, University of Georgia, [2]Department of Plant Pathology, University of Florida.

11. **Bumpy beech: Identifying a novel forest pathogen.** Julia Luyk[1], Colton Meinecke[1], Caterina Villari[1], [1]D.B. Warnell School of Forestry & Natural Resources, University of Georgia. Athens, GA.

12. **Deadwood dwellers: Insects and fungi utilizing downed oaks and pines.** Gabriel Tigreros[1,2], Kier Klepzig[1], and Joseph McHugh[2], The Jones Center at Ichauway[1] and University of Georgia[2].

13. **Legacies of disturbance and management: How do management practices affect ant communities in a longleaf pine ecosystem?** Ourania M. Nikolaidis[1], James T. Vogt[2], Kier D. Klepzig[3], and Kamal J.K. Gandhi[1], University of Georgia[1], USDA-FS-SRS[2], and Jones Center at Ichauway[3].

14. **Forecasting future forest invaders with i-Tree Pest Predictor.** Ashley Schulz[1], Angela Hoover[2], Angela Mech[3], Matthew Ayres[4], Andrew Liebhold[5], Travis Marsico[6], and Kathryn Thomas[2], [1]Mississippi State University, [2]United States Geological Survey Southwest Biological Science Center, [3]University of Maine, [4]Dartmouth College, [5]USDA Forest Service, [6]Arkansas State University.

15. **Use of drones to assess pest impact on urban forests as part of Tree Campus USA.** Kulhavy, D. L., D. Unger, V. Williams, I. Hung and Y. Zhang, Arthur Temple College of Forestry and Agriculture, Stephen F. Austin State University, Nacogdoches, TX.

16. **Identifying climatic factors associated with brown spot needle blight of loblolly pine in the Southeastern United States.** Olatinwo, R.O., Jaesoon Hwang, and C. Wood Johnson, USDA Forest Service, Southern Research Station, Pineville, LA, 71360.

17. **Impact of competition and site quality on green ash resilience in the North Carolina Piedmont.** Jonathan Kressuk[1], Kelly Oten[1], Robert Jetton[1], and Zakiya Leggett[1], North Carolina State University[1].

18. **Assessing egg releases in establishing *Laricobius* populations on eastern hemlock.** Greg Wiggins[1], Charles Dial[1], Nancy Oderkirk[1], Jackie Fredieu[1], Martha Flanagan[1], and Rusty Rhea[2], [1]Beneficial Insects Laboratory, Plant Industry Division, North Carolina Department of Agriculture and Consumer Services, Raleigh, NC 27699 and [2]Forest Health Protection, Southern Region, USDA Forest Service, Asheville, NC 28804.

19. ***Anoplophora glabripennis* WATCH: Preliminary results of potential ecological impacts in North Carolina.** Kristin Hilborn[1], Kelly Oten[1], and David Coyle[2], North Carolina State University[1], Clemson University[2].

20. **How do climate factors affect Ips beetle dynamics in planted pine forests?** Hanusia Higgins[1], Elizabeth P. McCarty[1], Cristian Montes[1], Kier D. Klepzig[2], Caterina Villari1, and Kamal J. K. Gandhi[1], University of Georgia[1] and The Jones Center at Ichauway[2].

21. **Ash trees: The next generation?** David Bechtel[1] and Jerome Grant[1], University of Tennessee[1].

22. **Implications of insects & arthropods in invasive callery pear (*Pyrus calleryana* Decne.).** Jordan B. Bailey, J. Forest Palmer, David R. Coyle, Jess Hartshorn, Michael L. Ferro, Clemson University.

23. **Trees just wanna have sun: a silvicultural approach to hemlock restoration and management of hemlock woolly adelgid.** Lauren Gonzalez[1], Robert Jetton[1], Bud Mayfield[2], Andy Whittier[2], and Bryan Mudder[2], North Carolina State University1 and USDA-FS-SRS2.

24. **Proposing a joined network of forestry professionals to combat forest health and productivity issues within the west gulf region and extended through the South.** Laura Sims[1], Joshua Adams[1], Nan Nan[1], Shaoyang Yang[1], Gordon Holley[1], Jeremy Stovall[2], and John Lock[3], Louisiana Tech University[1], Stephen F. Austin University[2], Caddo Sustainable Timberlands[3].

25. **Phenology of elm zigzag sawfly in North Carolina.** Delaney Serpan[1], Abby Ratcliff[1], and Kelly Oten[1], North Carolina State University[1].

26. **Effects of fire regimes on wild pollinators in managed pine forests.** E. McDonald[1], Briggs, E[1]., Fortuin C.[2], Gandhi K.[1], University of Georgia[1], Mississippi State University[2].