



# Southern Forest Health Research and Management Update



Summer 2019

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 and Invasive Plants of  
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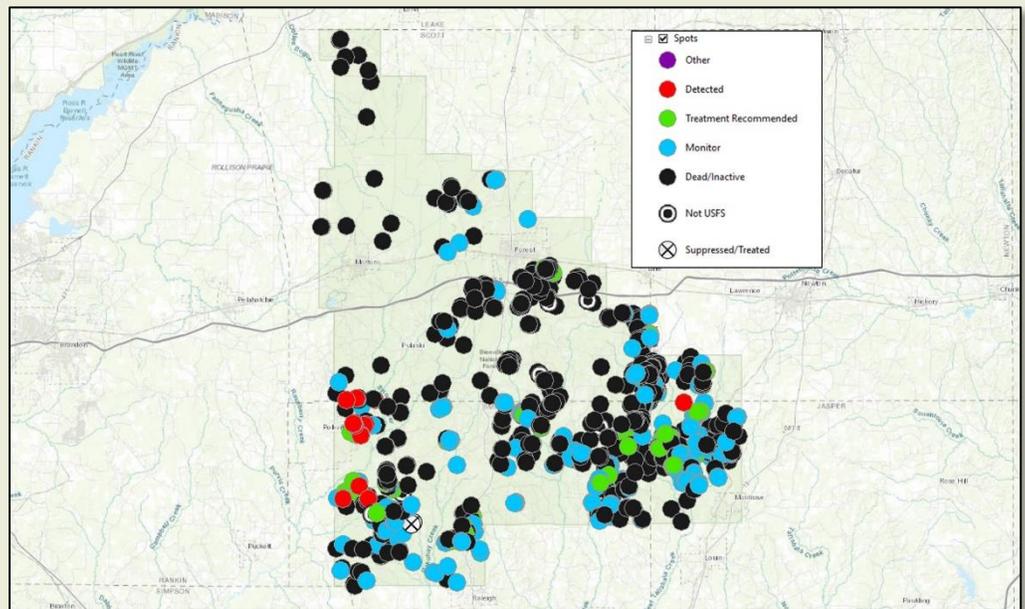
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## Science and Program Highlights

### Southern pine beetle outbreak on the National Forests in Mississippi appears to be waning

Following two successive years (2017 & 2018) of severe outbreak activity on the National Forests in Mississippi, southern pine beetle (SPB) activity finally appears to be on the decline. Prior to 2019, SPB activity had generated more than 7,200 spots, impacting nearly 27,000 acres, across three separate Districts (Bienville, Homochitto and Tombigbee), resulting in nearly 6,000 acres of Cut & Leave suppression treatments and over 5,000 acres of Cut & Remove suppression/salvage sales. Carryover beetle activity from unsuppressed infestations in 2018 has led to over 1,000 spots on the Bienville and 259 spots on the Homochitto in 2019. However, since detection, the majority of infestations have gone dead/inactive on their own. Currently there are 130 spots being targeted for Cut & Remove suppression/salvage sales on the Bienville, encompassing approx. 250 acres, with another 272 active spots (all <1 ac in size) being monitored. The Bienville is also planning on conducting an additional 2,700 acres of first-thinnings this year, and planting 400+ acres of longleaf, as they transition from beetle suppression to prevention and restoration activities. The Homochitto has only a dozen or so infestations targeted for suppression measures, as they also work towards implementing more stand-level prevention and restoration measures. For more information contact Jim Meeker ([james.meeker@usds.gov](mailto:james.meeker@usds.gov)).



Overview of the status of SPB activity on the Bienville NF as of August 12th, via the 'SPB Spots for Collector – Field Service' app in ArcGIS On-Line (AGOL). This new system is being utilized to operationally record, manage and report on SPB activity on the NFs in MS. Note that the vast majority of this year's spots have gone dead/inactive (black circles) and relatively few warrant suppression measures (green circles).

## Investigating factors contributing to understory plant species turnover in southern forests

Graduate student David Mason (Mississippi State University) recently completed his thesis work investigating factors contributing to understory plant species turnover in southern forests. David used repeat surveys of plots on the Tombigbee National Forest and the Sam D. Hamilton Noxubee National Wildlife Refuge in MS to determine whether changes in these plant assemblages appear to be controlled more by niche-based or more neutral (i.e., random) processes. Working with Dr. Gary Ervin (MSU) and Dr. Rima Lucardi (SRS-4552, USFS), David compared data collected in 2007-2009 by Ervin, Lucardi, and colleagues with his own resampling of those same study plots in 2017. David used a suite of ten competing hypotheses supporting either niche or neutral processes to assess the relative importance of each for explaining changes in understory plant composition. The findings suggested that changes observed in these habitats were driven predominantly by niche-based processes, with factors at the local plot scale contributing to the largest fraction of variation in plant species composition across time and among plots. David successfully defended his thesis in December 2018 and plans to pursue a PhD at the University of Florida. For more information contact Rima Lucardi ([rima.lucardi@usda.gov](mailto:rima.lucardi@usda.gov)).



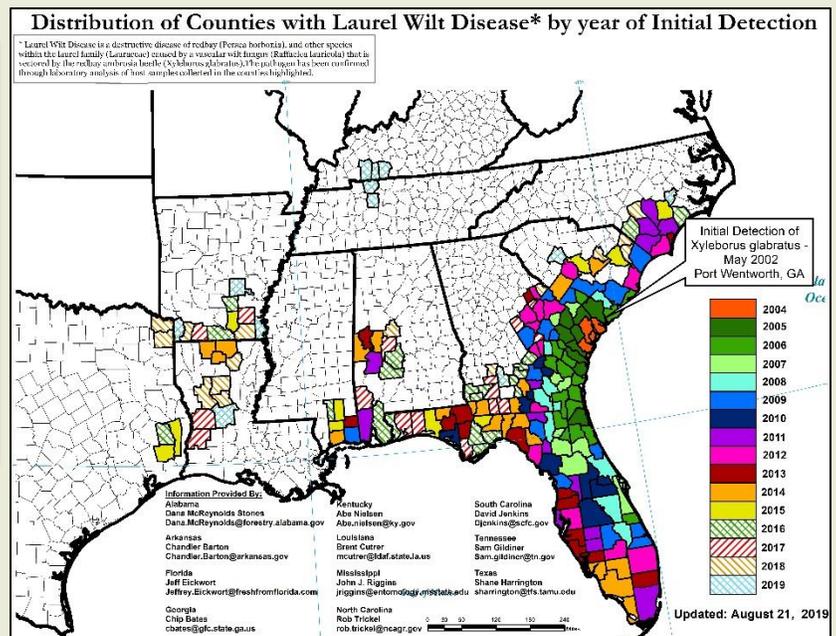
David Mason conducting soil texture analysis at Mississippi State University (Photo by GN Ervin).

## Laurel wilt disease found in Tennessee and Kentucky

In July 2019, symptomatic sassafras (*Sassafras albidum*) trees TN and KY were confirmed positive for laurel wilt disease. The initial positive wood samples from this region were collected by arborists with Bartlett Tree Experts from symptomatic trees near Fort Campbell, KY. Laurel wilt in TN and KY now includes at least five counties, all of which are located 200 miles or more from the next-nearest known infestations in AR and AL. Forest health professionals at local, state, and federal levels continue to investigate laurel wilt in this region. This large jump in the known range strongly suggests that laurel wilt continues spread by human movement of infested wood. For more information, contact Bud Mayfield ([albert.e.mayfield@usda.gov](mailto:albert.e.mayfield@usda.gov)).



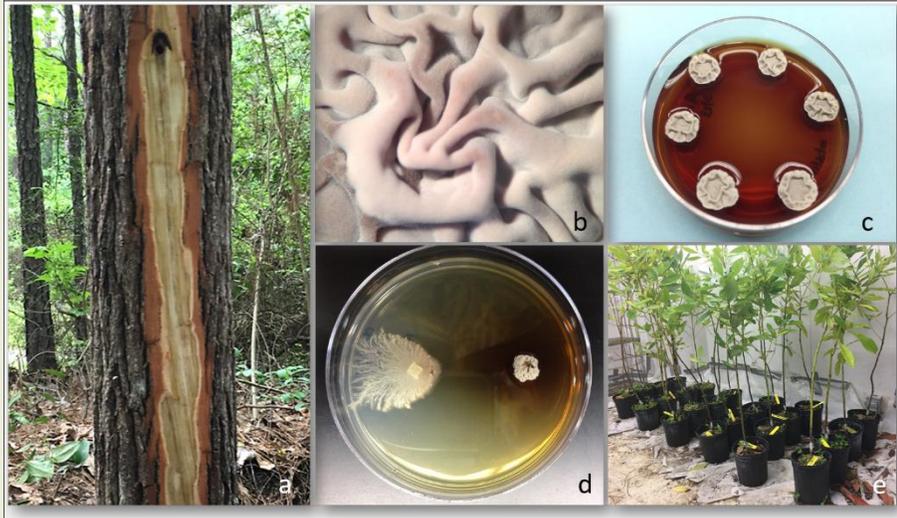
Bryan Mudder (SRS 4552), Sam Gildiner and Nicholas Pietrzak (TN Ag. Forestry), and a private landowner examine redbay ambrosia beetles in sassafras logs in Tennessee. Photo by A. Mayfield.



## Fighting fungus with fungus: new study on inhibition of the laurel wilt pathogen

Dr. Rabiou Olatinwo and Dr. Stephen Fraedrich USDA-SRS recently demonstrated that the fungus *Acaromyces ingoldii* inhibitory properties against the causal pathogen of laurel wilt, *Raffaella lauricola*. Secondary metabolites produced by the fungus significantly inhibited *R. lauricola* growth. Results from this study were recently accepted for publication in the Plant Health Progress journal of the American Phytopathological Society. The investigation represents a preliminary effort to identify microorganisms with natural compounds with fungicidal/fungistatic activities against *R. lauricola* that

could be potentially useful as part of integrated approach for managing laurel wilt. For more information contact Rabiou Olatinwo ([rabiou.o.olarinwo@usda.gov](mailto:rabiou.o.olarinwo@usda.gov)).



At left: (a) A sassafras tree showing sapwood tissue discoloration typical of *Raffaella lauricola* infection; (b) *Acaromyces ingoldii* mycelium observed under the dissecting microscope; (c) *A. ingoldii* with pigmented secondary metabolites on PDA; (d) Inhibition of *Raffaella lauricola* isolate by *A. ingoldii* secondary metabolites on PDA; and (e) Redbay seedlings inoculated with *R. lauricola* spores in the growth chamber.

## Autotoxicity research & development for the management and extirpation of invasive pests

Research Ecologist Dr. Rima Lucardi (SRS-4552) was invited to present at the National Invasive Species Issues Team Meeting (NISIT) on 18 July 2019, at the Sidney R. Yates Building, Washington Office. The invasive species autotoxicity team presented past and preliminary research and development of endogenous compounds for pesticide development, to much excitement to USFS R&D, NFS, S&PF, as well as to many within the USDA. The presenting team was comprised of Drs. Lucardi, Shiyou Li (Director of Pharmaceutical Crops Center, Stephen F. Austin State University) and Steven Bullard (Provost and Vice President of Academic Affairs, SFASU). The core team continues to build relationships to develop and test endogenous biochemical compounds for the purpose of lethally extirpating invasive species, starting with two major plant species negatively impacting the Southern Region (R8): Chinese tallow tree (*Triadica sebifera*) and cogongrass (*Imperata cylindrica*). This research team is responding to direct requests from the National Forest System and has recently held a team meeting at Mississippi State University in August. The University of Georgia has now joined the effort to innovatively manage invasive species of all taxa without the introduction of additional chemistries into ecosystems as well as the benefit of avoiding non-target impacts. For more information contact Rima Lucardi ([rima.lucardi@usda.gov](mailto:rima.lucardi@usda.gov)).



Drs. Rima Lucardi (left, SRS-4552) and Steven Bullard (right, SFASU) at the Washington Office after delivering the national presentation to NISIT (Photo by Shiyou Li).

## Effective log fumigation schedule determined for thousand cankers disease in black walnut

Eastern black walnut (*Juglans nigra* L.) is one of the most important commercial tree species in North America, with a standing volume recently valued at over \$500 billion. The United States averages \$325 million in annual exports of *J. nigra*, but regulations designed to prevent the spread of thousand cankers disease (TCD) have the potential to make walnut products more expensive and limit both domestic and international trade. Fumigation with methyl bromide has long been a preferred treatment for US log exports, and although its general use has been largely phased out under the Montreal Protocol, there is no planned phase-out for quarantine and preshipment use, and it remains a valuable tool to meet log import requirements of US trade partners. A team of researchers from USDA-APHIS, USDA Forest Service SRS-4552, and the University of Tennessee recently determined an effective methyl bromide fumigation schedule for TCD in



black walnut. The study, recently published in the journal *Forest Science* (<https://www.srs.fs.usda.gov/pubs/58241>), demonstrates that a fumigation schedule of at least 240 mg/L methyl bromide for 72 h at 10° C, which is currently approved to eliminate the oak wilt pathogen from oak logs for export, will also eliminate the thousand cankers disease vector and pathogen from black walnut bolts. Use of this schedule will help prevent additional spread of thousand cankers disease and will help minimize negative impacts on the black walnut log export market. For more information contact Bud Mayfield ([albert.e.mayfield@usda.gov](mailto:albert.e.mayfield@usda.gov)).

*At left: A black walnut tree with branch dieback caused by thousand cankers disease (Photo by Bud Mayfield).*

## In the News

### Scott Horn receives the SRS Director's Research Professional Support Award

Scott Horn, entomologist with SRS-4552 in Athens, GA, received the 2019 Southern Research Station Director's Research Professional Support Award. The award was given for Scott's outstanding contributions to research on pollinators and forest health issues in the southeastern U.S. in alignment with the agency's strategic goal of sustaining forests and grasslands. Scott plays a critical role in multiple ongoing research projects including studies that address the effects of forest management practices (e.g., prescribed fire, shrub removal) on pollinators, an investigation into causes of sugarberry mortality, and several studies on decomposition and nutrient cycling. Scott also works consistently with university graduate students, assisting them greatly with field work and providing advice and logistical support. Congratulations, Scott!



*SRS Director Rob Doudrick (left) presents Scott Horn with the 2019 SRS Research Professional Support Award.*

## Dr. Steve Clarke receives the A.D. Hopkins Award

In July 2019, the Southern Forest Insect Work Conference (SFIWC) presented Dr. Steve Clarke (FHP Region 8) with the prestigious A.D. Hopkins Award. The A.D. Hopkins award is the highest honor given by the SFIWC and is presented to an individual outstanding record of service to forest entomology in the southern United States.

Dr. Clarke has consistently gone beyond the expectations of his professional position with the US Forest Service Forest Health Protection. He has been a leader through his strong service and extension contributions, but also by contributing as a collaborator and co-author on 50+ scientific publications. Dr. Clarke has presented invited lectures and seminars throughout the South and internationally. He has obtained funding for multiple projects, thus insuring collaborative research and extension efforts on key southern insect problems. His expertise on SPB is frequently sought out and he has provided expert advice and assistance throughout its range.

Since his graduate student days, Steve has been one of SFIWC's most active participants and dedicated leaders. He has served on multiple committees and advisory boards, including serving as Local Arrangement Chair at three different SFIWC meetings. He has contributed to Resolutions Committee and History Committee, plus served twice as Work Conference Program Chair. He led efforts for more than ten years to establish and maintain the SPB Working Group. Finally, Steve has been the organizing force behind food bank drives associated with SFIWC meetings in multiple cities across the South, thereby assuring that SFIWC gives back to host communities. Congratulations, Steve!



*Dr. Steve Clarke, winner of the 2019 A.D. Hopkins Award, holds his framed photo of Andrew Delmar Hopkins, who is considered the father of forest entomology in the U.S.  
Photo by Brittany Barnes.*

## SRS, FHP forest health scientists contribute to the National Advanced Silviculture Program



*FHP plant pathologist Michelle Cram (left) and SRS research entomologist Bud Mayfield (far right) lead a forest health field trip on the Bent Creek Experimental Forest. Photos by Julia Kirschman.*

The National Advanced Silviculture Program (NASP) provides graduate-level instruction in silviculture and forest ecology to USDA Forest Service employees seeking to be certified as silviculturists. Every two years, a portion of the NASP Mountain Module is hosted by Dr. Tara Keyser and the Bent Creek Experimental Forest. In May 2019, FHP plant pathologist Dr. Michelle Cram, SRS research ecologist Dr. Rima Lucardi, and SRS research entomologist Dr. Bud Mayfield contributed to the Mountain Module by providing lectures on forest pathology, invasive plants, and forest insects, respectively. The session included a field trip led by Mayfield and Cram highlighting a variety forest insect and disease issues on the experimental forest.

## Staff Changes

### Dr. Thomas Whitney leaves SRS-4552 for Washington State University



Dr. Thomas D. Whitney graduated from the University of Georgia with his Doctorate in Forestry and Natural Resources in May 2019. Thomas immediately joined Washington State University as a Postdoctoral Researcher in the Research and Extension Center in Puyallup, WA. Dr. Whitney was co-advised by Drs. Rima Lucardi (SRS-4552) and Kamal Gandhi (UGA, Warnell) throughout his tenure at UGA. All of Dr. Whitney's dissertation chapters have been published and are listed below. Congratulations, Thomas!

*At left: Drs. Thomas D. Whitney with his major co-advisor Rima D. Lucardi after being hooded at the University of Georgia Commencement on 10 May 2019 (Photo by Dr. Maria Dantas Whitney).*

## Technology Transfer

### Publications (in print/press):

1. Bolner, N.G., Jackson, P.D., Barnett, J.P., and Olatinwo, R. 2019. **Evaluation of Sowing Methods to Determine the Role of Hypocotyl Extension in Longleaf Pine Seedling Development.** Tree Planter's Notes. In press.
2. Horn, S., J.L. Hanula and M.D. Ulyshen. 2019. **Arthropod Abundance and Biomass in Response to *Pinus taeda* L. Trunk Height.** Journal of Entomological Science. In press.
3. Mayfield, A.E. III, J. Juzwik, J. Scholer, J.D. Vandenberg, and A. Taylor. 2019. **Effect of bark application with *Beauveria bassiana* and permethrin insecticide on the walnut twig beetle (Coleoptera: Curculionidae) in black walnut bolts.** J. Econ. Entomol. <https://doi.org/10.1093/jee/toz150>
4. Miller DR. **Effects of ethanol and  $\alpha$ -pinene on attraction of bark and woodboring beetles to multiple-funnel traps baited with ipsenol + ipsdienol.** J. Entomol. Sci. In press.
5. Miller DR. 2019. **Flight phenology of female *Sirex nigricornis* in western North Carolina.** J. Entomol. Sci. In press.
6. Miller, D.R., C.M. Crowe, and J.D. Sweeney. 2019. **Trap height affects catches of bark and woodboring beetles in baited multiple-funnel traps in southeastern United States.** J. Econ Entomol. In press.
7. Olatinwo, R. and Fraedrich, S., 2019. An *Acaromyces* species associated with bark beetles from southern pine has inhibitory properties against *Raffaelea lauricola*, the causal pathogen of laurel wilt disease of redbay. Plant Health Progress. In press.
8. Olatinwo R., Hwang, J., Johnson, W., and Fraedrich, S.W. (2019) First Report of Laurel Wilt Disease Caused by *Raffaelea lauricola* on Swamp Bay in Louisiana. Plant Disease. Published Online: 7 March 2019. <https://doi.org/10.1094/PDIS-02-19-0284-PDN>.

9. Poole, E.M., Ulyshen, M.D., Horn, S., Cram, M., Olatinwo, R. and Fraedrich, S., 2019. Biology and distribution of *Agrilus macer* LeConte (Coleoptera: Buprestidae), a species associated with sugarberry (*Celtis laevigata* Willd.) mortality in the southeastern USA. *Annals of Forest Science*, 76(1), p.7.
10. Seabright, K., S.W. Myers, S.W. Fraedrich, A.E. Mayfield III, and A. Taylor. 2019. **Methyl bromide fumigation as a phytosanitary treatment for black walnut logs infested with the thousand cankers disease vector and pathogen.** *Forest Science*. <https://doi.org/10.1093/forsci/fxz001>
11. Salom, S.M., G. Davis, J. Elkinton, J. Foley, N. Havill, C. Jubb, A. Mayfield, T. McAvoy, R. Rhea, R.T. Trotter III, and M. Whitmore. 2019. **A response to “Media representation of hemlock woolly adelgid management risks: a case study of science communication and invasive species control,” published in Biological Invasions online on September 18, 2018.** *Biological Invasions* 21: 2009-2017. <https://doi.org/10.1007/s10530-019-01953-7>.
12. Schulz, A.N., R.D. Lucardi, and T.D. Marsico. 2019. **Successful invasion and failed biocontrol: the role of antagonistic interactions. A Research Review.** *BioScience*. <https://doi.org/10.1093/biosci/biz075>.
13. Whitney, T.D., K.J.K. Gandhi, J.L. Hamrick, and R.D. Lucardi (in press). **Extant population genetic variation and structure of eastern white pine (*Pinus strobus* L.) in the Southern Appalachians.** *Tree Genetics and Genomes*.
14. Whitney, T.D., K.J.K. Gandhi, and R.D. Lucardi (in press). **Native or non-native? Historical biogeography of an emergent forest pest, *Matsucoccus macrocitrices*.** *Journal of Biogeography*.
15. Zomlefer, W.B., J.R. Comer, R.D. Lucardi, J.L. Hamrick, and J. Allison. 2018. **Distribution and genetic diversity of the rare plant *Veratrum woodii* (Liliales: Melanthiaceae) in Georgia: A preliminary study with AFLP fingerprint data.** *Systematic Botany* 43(4): 858-869. doi: <https://doi.org/10.1600/036364418X697779>.

### Submitted Publications (in review):

1. Bedoyaa CL, Hofstetter R, Nelson XJ, Hayes M, Miller DR, Brockerhoff EG. **Sound production in bark and ambrosia beetles.** *Bioacoustics*. Submitted August 2019.
2. Whitehurst, L., C. Cunard, J. Reed, S. Worthy, T. Marsico, R. Lucardi, K. Burgess (in review). **Evaluating the efficacy of metabarcoding for the detection of nonnative plant propagules entering the Port of Savannah, Georgia, USA.** *Biological Invasions*.

### Presentations and Lectures:

1. Barnett, J.P., Jackson, P.D. and Olatinwo, R.O. 2019. **Hybridization of Longleaf Pine: Is There a Growing Problem?** 20th Biennial Southern Silvicultural Research Conference, 12 Mar 2019 Shreveport, LA.
2. Cram, M., Fraedrich, S., Olatinwo, R., Ulyshen, M., Poole, E., Niyas, A., and Villari C. 2019. **Investigation of potential pathogens associated with sugarberry (*Celtis laevigata* L.) mortality in Georgia and South Carolina.** 60th Southern Forest Insect Work Conference July 23-26, 2019 Savannah, Georgia.
3. Horn, S. 2019. **The Kudzu bug: An accidental introduction with beneficial effects.** Invited Presentation—Coweeta “Brown Bag” Seminar, Coweeta Hydrologic Laboratory. March 28th, 2019.
4. Sweeney, J., P. Silk, P. Mayo, K. Ryall, D.R. Miller, C. Hughes, K. Van Rooyen, J.M. Gutowski, Q. Meng, Y. Li, J. Francese, and D. Rassati. **November 2018. Early detection and monitoring strategies for buprestids.** Joint Annual Meeting of Entomol. Soc. America & Entomol. Soc. Canada, Vancouver BC. (Invited Talk)
5. Jubb, C.S., A. Mayfield, G.J. Wiggins, J.F. Grant, J. Elkinton, T. McAvoy, J. Lombardo, B. Mudder and S. Salom. 2017. **Impact assessment of predatory beetle, *Laricobius nigrinus* (Coleoptera: Derodontidae), on hemlock**

- woolly adelgid (Hemiptera: Adelgidae) in the eastern U.S.** Annual Meeting Entomol. Soc. America, 11 Nov 2018, Vancouver, BC, Canada and Southern Forest Insect Work Conference, 24 July 2019, Savannah, GA.
6. Lucardi, R.D., S. Li, S.H. Bullard. 2019. **The biology and ecology of nonnative invasive plants of the Southern Region and application of novel endocide research and development** [Oral] Invited presentation to the USDA Forest Service, National Invasive Species Issues Team (NISIT). Washington Office, Yates Building. 18 July 2019. Washington, D.C.
  7. Lucardi, R.D., S.C. Hughes, W.B. Zomlefer. 2019. **The ecology of invasive plants: Patterns and processes in forest systems + Plant Collections and Cataloguing workshop: The importance of natural history collections in temporal and spatial inventory and monitoring of invasive plants.** [Oral + Hands-on Workshop] Invited Workshop as part of the 2019 National Advanced Silviculture Program—Mountain Module. Bent Creek Experimental Forest Training Center. 13 May 2019. Asheville, NC.
  8. Lucardi, R.D., W.B. Zomlefer, J.R. Comer, J.L. Hamrick, and J. Allison. 2019. **Distribution and genetic diversity of the rare plant *Veratrum woodii* (Liliales: Melanthiaceae) in Georgia** [Oral] The 80th Annual Meeting of the Association of Southeastern Biologists (ASB). 04 April 2019. Memphis, TN.
  9. Marsico, T.D, C.E. Cunard, J.K. Gravesande, S.C. Hughes, L.E. Whitehurst, K.S. Burgess, R.D. Lucardi. 2019. **Invasive plant propagules are viable upon arrival at ports of entry** [Oral] BOTANY 2019-Botanical Society of America, Annual Meeting. 27-31 July 2019. Tucson, AZ.
  10. Mayfield, A.E., III, and S.J. Seybold. 2018. **Impacts of invasive species in terrestrial and aquatic systems in the USA.** Annual Meeting Entomol. Soc. America, 14 Nov 2018, Vancouver, BC, Canada. Invited.
  11. Mayfield, A.E., III, R.M. Jetton, and C.F. Miniati. **Let There Be Light: Exploring silvicultural release as a management tool against the hemlock woolly adelgid.** Coweeta Hydrologic Laboratory, Brown Bag Seminar, 12 Feb 2019, Otto, NC. Invited.
  12. Mayfield, A. 2019. **Standing in the gap: Research updates on the use of silviculture and biological control for HWA.** Western Maryland Forest Pest Update, 27 Feb 2019, New Germany State Park, MD. Invited.
  13. Mayfield, A.E. III, S.W. Fraedrich, R. Olatinwo, and J. Hwang. 2019. **Beyond redbay: Monitoring the Spread and Impact of Laurel Wilt in Sassafras.** Southern Appalachian Forest Entomology and Pathology Seminar, 14 Mar 2019, Crossnore, NC; and Southern Forest Insect Work Conference, 23 July 2019, Savannah, GA.
  14. Mayfield, A.E., III, J.R. Rhea and R.M. Jetton. 2019. **Exploring the potential of silvicultural release to improve the health of eastern hemlocks infested with the hemlock woolly adelgid.** Southern Forest Insect Work Conference, 23-26 July 2019, Savannah, GA (poster).
  15. Mayfield, A., S. Fraedrich, R. Rabaglia, J. Johnson, L. Reid, C. Bates, D. Duerr, and S. Cameron. 2019. **It's Here...Now What? Responses of forest health specialists and researchers to a new introduction.** Southern Forest Insect Work Conference, 23 July 2019, Savannah, GA. Invited, plenary.
  16. Mayfield, A. 2019. **Unwelcome Guests in the Garden: Invasive arboreal insect pests, present and approaching.** Men's Garden Club of Asheville, 2 April 2019, Asheville, NC. Invited.
  17. Mayfield, A. 2019. **What does a scientist do?** Presentation to 3rd grade classes and teachers at Fairview Elementary School, 6 June 2019, Fairview, NC. Invited.
  18. Mayfield, A., and B. Mudder. 2018. **Field trip and field lecture on hemlock woolly adelgid impact.** Clemson University Integrated Forest Pest Management Course, South Saluda field insectary, 18 Oct 2018, Cleveland, SC.
  19. Mayfield, A. 2019. **Classroom lecture and field demonstration tour on Forest Entomology.** National Advanced Silviculture Program (NASP) Local Silviculture Mountain Module, May 2019, Bent Creek Experimental Forest, Asheville, NC.

20. Miller, D., K. Dodds, and J. Sweeney. July 2019. **Factors affecting trap catches of hardwood borers.** South. For. Insect Work Conf., Savannah GA. (Talk)
21. Miller, D., C. Crowe, and J. Sweeney. July 2019. **Trap height affects catches of bark and wood boring beetles in a stand of white oak and shortleaf pine.** South. For. Insect Work Conf., Savannah GA. (Poster)
22. Miller, D., C. Crowe, M. Ginzler, T. Poland, C. Ranger, P. Schultz, and B. Willhite. July 2019. **Effects of ethanol and conophthorin release rates on catches of ambrosia beetles.** South. For. Insect Work Conf., Savannah GA. (Poster)
23. Miller, D.R., J.D. Allison, C.M. Crowe, D. Dickinson, A. Eglitis, R.W. Hofstetter, A.S. Munson, T.M. Poland, L.S. Reid, B.E. Steed, and J.D. Sweeney. July 2019. **Attraction of pine sawyers (*Monochamus* spp.) and associates to traps baited with ipsenol and monochamol in Canada and the USA.** South. For. Insect Work Conf., Savannah GA. (Poster)
24. Olatinwo R.O., Jackson, P.D., Sung, S., Mangini, A., Strom, B., and Barnett, J. 2019. **Genetic Markers for Identification of Southern Pine Species.** Presented at the 20th Biennial Southern Silvicultural Research Conference, 12 Mar 2019 Shreveport, LA.
25. Jackson, P.D., Barnett, J.P., Olatinwo, R.O., Strom, B., and Sung, S. 2019. **Field observations of Longleaf Pine Seedlings to Determine the Extent of Hybridization.** Presented at the 20th Biennial Southern Silvicultural Research Conference, 12 Mar 2019 Shreveport, LA.
26. Olatinwo, R., Hwang, J., and Johnson, C.W. 2019. **A report of hickory decline in Louisiana.** The 60th Annual Southern Forest Insect Work Conference July 23-26, 2019 Savannah, Georgia.
27. Poole E., Ulyshen M., Horn, C., Cram, M., Olatinwo, R., and Fraedrich, S. 2019. **An assessment of insects associated with sugarberry mortality.** The 60th Annual Southern Forest Insect Work Conference July 23-26, 2019 Savannah, Georgia.
28. Prince, C.M., MacDonald, G.E., and Lucardi, R. 2019. **Cold tolerance of wildtype and hybrid *Imperata cylindrica* (cogongrass)** [Oral] 7th Biennial FWC Research Review. March 2019. Orlando, FL.
29. Sweeney, J., P. Silk, P. Mayo, K. Ryall, C. MacQuarrie, D.R. Miller, C. Hughes, K. Van Rooyen, J.M. Gutowski, T. Mokrzycki, Q. Meng, Y. Li, J. Francese, D. Rassati, and T. Kimoto. November 2018. **Going green and getting high improves detection of exotic, potentially invasive bark and wood boring beetles.** Invasive Insects Grand Challenges Summit, Vancouver BC. (Poster)
30. Vogt, J.T., J. MacGown, F.A. Roesch, C. Crowe, S. Horn. And M. Ulyshen. 2019. **Ant Foraging Activity in Long-Term Experimental Privet Plots.** Southern Forest Insect Work Conference, 23-26 July, Savannah, GA.
31. Wallin, K.F., A. Neidermeier, L. Farley, D.W. Ross, B. Mudder, and A.E. Mayfield. 2019. **Update: Evaluating the use of silver flies from the western U.S. on HWA in the eastern U.S.** 5th Annual Hemlock Woolly Adelgid Program Managers Summer Planning Meeting, 30 July 2019, Holland MI. Invited, presented by Mayfield.
32. Whittier, A., R. Jetton, and A. Mayfield. 2018. **Camcore Domestic Conservation Update.** Camcore Annual Meeting, October 2, 2018, Manizales, Colombia. Presented by Whittier.
33. Whittier, W.A., A.E. Mayfield III, and R.M. Jetton. **Silvicultural strategies to improve the sustainability of eastern hemlock.** 20th Biennial Southern Silvicultural Research Conference, 12-14 Mar 2019, Shreveport, LA (oral presentation and poster). Presented by Whittier.
34. Whitehurst, L.E., C.E. Cunard, J.N. Reed, S.J. Worthy, T.D. Marsico, R.D. Lucardi, K.S. Burgess 2019. **Evaluating the efficacy of DNA barcoding for the detection of non-native invasive plant propagules at the Port of Savannah, Georgia** [Oral] BOTANY 2019-Botanical Society of America, Annual Meeting. 27-31 July 2019. Tucson, AZ.

35. Whitney, T.D., R.D. Lucardi, K.J.K. Gandhi 2018. **A novel insect-pathogen complex and its association with eastern white pine dieback** [Poster] Member Symposium: From Invertebrate Ecology to Evolutionary Biology; Celebrating the Achievements of Professor John R. Spence. Annual Meeting of the Entomological Society of America. November 2018. Vancouver, BC, Canada. ...
36. Whitney, T.D., R.D. Lucardi, K.J.K. Gandhi. 2018. **Origins of an emergent forest health pest: population genetics structure of the eastern white pine bark scale (*Matsucoccus macrocitrices*)** [Oral] Graduate Student Showcase at the Annual Meeting of the Entomological Society of America. November 2018. Vancouver, BC, Canada.

## USDA Forest Service

### Forest Health Protection, Southern Region

<http://www.fs.usda.gov/main/r8/forest-grasslandhealth>

### Southern Research Station

#### RWU 4552: Insects, Diseases and Invasive Plants of Southern Forests

<http://www.srs.fs.usda.gov/idip/index.html>

