



Southern Forest Health Research and Management Update



Summer 2016

IN THIS ISSUE

- 1 – SPB Activity Escalates
- 1 – Redbay Ambrosia Beetle
- 2 – Sugarberry Mortality
- 2 – Gypsy Moth Conditions
- 3 – Emerald Ash Borer
- 4 – Bug Day Success



- 5 – Staff News
- 6 – Tech Transfer

This newsletter is a joint publication of:

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Science and Program Highlights

SPB Activity Escalates on the National Forests in Mississippi....Again

Forest Health Monitoring (FHM) overview flights (conducted by **Chris Steiner** and **Wood Johnson**, R8-FHP) in mid-June identified tens of suspect southern pine beetle (SPB) spots on the Bienville and Homochitto National Forests in Mississippi (NFMS), and the Oakmulgee Ranger District of the National Forests in Alabama. Subsequent ground evaluations confirmed numerous actively enlarging infestations on both forests in Mississippi with the vast majority located in dense, unthinned stands of poletimber less than 40 years old. Numerous other active infestations have since become apparent via further ground work, necessitating SPB detection flights via helicopter. At the time of this writing, the Homochitto had just completed their first detection flight and identified more than 350 spots containing >10 fading pines, and Bienville has yet to fly. Given the limited resources available for cut & leave suppression operations, it is likely that any future suppression efforts on the NFMS will be forced to prioritize which actively enlarging infestations will get treated. In the meantime, a handful of actively enlarging infestations on the Bienville and Homochitto are being experimentally treated with a new formulation of SPB's anti-aggregation pheromone [i.e., (+)-verbenone], in a collaborative effort with Forest Service R&D, funded by the Forest Service Pesticide Impact Assessment Program.

New Insights Into Trapping the Redbay Ambrosia Beetle



A grid of funnel traps used to evaluate the effect of close trap spacing on captures of the redbay ambrosia beetle.

The redbay ambrosia beetle carries the pathogen that causes laurel wilt, a disease which has killed millions of redbay and sassafras trees in the Southeastern United States. A recent study by SRS 4552 scientists **Jim Hanula** (Emeritus), **Bud Mayfield**, **Scott Horn**, and cooperator **Laurie Reid** provides new insights into responses of this invasive pest to traps baited with host odor-based lures.

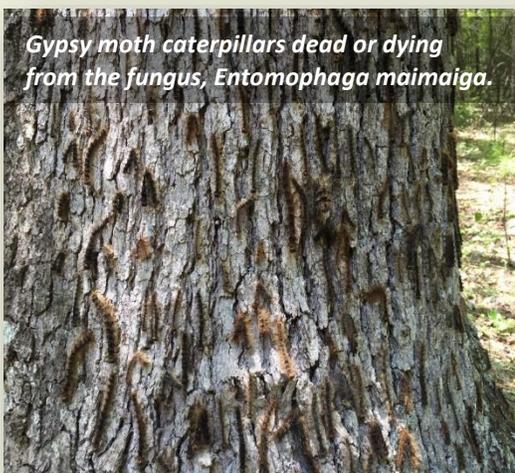
(Continued from page 1) The study, published in the Journal of Economic Entomology (www.treesearch.fs.fed.us/pubs/52092), demonstrated that attempts to “trap out” low beetle populations using a grid of traps baited with commercially available lures for five months failed to reduce subsequent attacks on fresh redbay wood placed into the stand. In a separate experiment, baited traps in grids spaced as close as 1 m did not interfere with each other in terms of the numbers of beetles trapped. The results suggest that the effective distance over which current essential oil lures “pull” redbay ambrosia beetles into traps is less than 1 m, and that newer, more attractive lures will be needed to be useful in managing populations of this insect. For more information, please contact Bud Mayfield (amayfield02@fs.fed.us).

Ongoing Research Addresses Sugarberry Mortality

Research is underway to investigate what role, if any, insects or pathogens are playing in the declining health and mortality of sugarberry (*Celtis laevigata* Willd.) in North Augusta, South Carolina. A preliminary survey indicates that at least two insect species are commonly associated with stressed trees in our study area. The first is the Asian Woolly Aphid (*Shivaphis celti* Das), which is widely found on sugarberry foliage and commonly results in thick layers of sooty mold forming on the leaves. The second is a species of native wood-boring buprestid beetle (*Agrilus macer*) that lays egg masses on the bark of weakened trees, often at very high densities (e.g., >1000 egg masses/m² with ~16 eggs per mass). So far, several species of *Fusarium* have been found associated with discolored areas of sapwood near galleries created by the beetle larvae. An insecticide trial was initiated in October 2015 to determine whether trees treated with imidacloprid, emamectin benzoate or both compounds exhibit better survivorship relative to untreated controls.



Forest Service researchers involved include **Michael D. Ulyshen, Scott Horn, Rabiou Olatinwo, Stephen Fraedrich, and Michelle Cram**. For more information, please contact Mike Ulyshen, mulyshen@fs.fed.us



Gypsy Moth Conditions on National Forest Lands in Virginia 2016

The USDA Forest Service has announced there has been widespread gypsy moth, *Lymantria dispar*, activity and some tree defoliation this summer across the George Washington and Jefferson National Forests. Activity and defoliation have occurred in Bland, Botetourt, Bedford and parts of Rockbridge and Pulaski counties. On June 20, 2016, the US Forest Service (Forest Health Protection) flew an aerial survey of the National

Forests and recorded 39,380 acres of defoliation, including 14,000 acres in Bland County. While the 39,380 acres represents an increase from 2015 defoliation, the gypsy moth fungus, *Entomophaga maimaiga*, has been at work in keeping many caterpillars from pupating and reaching adulthood.

The impact of the fungus on gypsy moths in 2017 will be dependent on weather conditions in April and early May of next year. The gypsy moth first caused noticeable defoliation in 1987 on the George Washington and Jefferson National Forests reaching its worst outbreak in 2001 with over 300,000 acres defoliated. The level of gypsy moth activity this year shouldn't mark a return to multiple years of widespread gypsy moth defoliation and the level of tree mortality experienced in the 1980s. The last outbreak of gypsy moth on the National Forests in Virginia was in 2008.



Early season gypsy moth defoliation in upper tree canopy.

For more information, please contact **Derek Puckett**, dlpuckett@fs.fed.us.

Update on the Emerald Ash Borer (EAB) in Region 8

From the FHP Pineville, LA field office: EAB continues moving south. Texas joined the ranks of the EAB states with a detection on April 29, 2016. The specimens were collected in eastern Harrison Co. in a green prism trap baited with Z-3 hexanol, and the recently described near-range pheromone, 3-Z lactone. The trap was a part of a coordinated effort by SRS and FHP to compare, in a simple paired design, the standard national trap (purple prism trap baited with Z-3 hexanol) with a green prism trap (using both Z-3 hexanol and pheromone). Results suggest that, if budgets allow, 2017 EAB trapping surveys should not rely solely on the standard national trapping system.

From the Asheville, NC field office: EAB is advancing rapidly in states that only a year or two ago were lightly infested. Population clusters documented from previous positive trap catches are enlarging and sometimes converging with other infestations. This summer, EAB was confirmed in three new forests: Pisgah Forest within the National Forests of North Carolina, Cherokee National Forest (TN), and the Chattahoochee National Forest (GA). Ash mortality due to EAB is becoming a common sight in older infestations on the George Washington/Jefferson National Forests (VA) and Daniel Boone National Forest (KY) where EAB was first documented two years ago.

For more information, please contact **Wood Johnson**, woodjohnson@fs.fed.us, or **Paul Merten**, pmerten@fs.fed.us.

In The News

Bug Day 2016 – A Success!

The 9th Annual Kent House Bug Day was held Saturday, June 4th, 2016 and was a great success! In spite of rain threats, more than 1400 people of all ages ventured out into the Louisiana heat and humidity to participate.

The lines were long as they waited patiently to taste **JoAnne Barrett's** (SRS Unit 4552) Chocolate Chirp Cookies made with special cricket flour. Each person who tasted them received the "I Ate a Bug" button!

Will Shepherd (SRS Unit 4552) also drew a crowd as live fireants, lubber grasshoppers, and Bess beetles crawled around his "Louisiana Insects" station. Everyone also stood in line to see Elvis the baby alligator and his handler, **Kristi Wharton** (SRS Unit 4158) at the ever-popular "Insectivores" station.

College students (SRS Unit 4552), **Rebekah Magee, Chan Jin,** and **Jency Baraha,** managed the "Night Insect" room which showcased the unusual, exotic sugar gliders and glow-in-the-dark scorpions. And, of course, the giant cave cockroaches and Madagascar hissing cockroaches remain huge crowd pleasers every year. Over 20 stations were available for participants to interact with specialists, entomologists, and a variety of agencies to learn about the benefits of insects.



Bug Day visitor is excited about getting her "I Ate a Bug!" pin.



"Louisiana Insects" Station hosted by Will Shepherd, RWU-4552.



JoAnne Barrett and Stacy Blomquist (middle, left-right) during interview with local TV station.

Staff News

Goodbye to Stacy Blomquist

RWU-4552 said goodbye to **Stacy Blomquist**, aka Bug Lady. Stacy transferred to the Kisatchie National Forest as their new Public Affairs Specialist effective May 15, 2016. Stacy is well-known throughout the Alexandria/Pineville community as the “Bug Lady” and has shared many bugs with kids and adults alike during her tenure as Biological Science Technician with Southern Research Station. She is probably best known for her infectious enthusiasm for entomology at the Annual Bug Day at the Kent House Plantation in Alexandria, LA and her assistance with Bugfest at the North Carolina Museum of Natural Sciences in Raleigh, North Carolina. Stacy brought hands-on experience for visitors and shared her professional expertise at these events and many others during her SRS career. She also had on-going projects with the Sci-Port Museum and the Louisiana State Exhibit Museum in Shreveport, La.

Stacy started with the Southern Research Station as a contract worker in 2001 and then as a part-time biological science technician in 2002. She worked closely with Dr. John Moser on phoretic arthropods, mites, and town ants and they had several publications together.

Stacy also served as a past member and zone representative for the Station’s Civil Rights Committee where her work is remembered for both active participation and bringing the views of Station employees to the attention of Station headquarters in an engaging and productive way.

We wish Stacy all the best in her new position and look forward to cooperating with her on projects of mutual interest at the Alexandria Forestry Center.



Dr. Brian Strom presents plaque to Stacy Blomquist at her farewell party.

James H. Miller Certified as Senior Ecologist

Dr. James H. Miller was recently recognized again as a “Certified Senior Ecologist” by the Ecological Society of America. His recertification is in effect for another 5 years.

Susan Best Completes Degree

Congratulations to **Susan Best** for completing requirements for her MS degree in Agronomy at Iowa State University by defending her thesis this past June in Ames, Iowa. Her thesis title was “Systemic movement of *Raffaelea lauricola* through the rhizomes in pondberry (*Lindera melissifolia*).

Technology Transfer

Publications (in print/press):

1. Audley, J., A. Taylor, W.E. Klingeman, A.E. Mayfield, and S.W. Myers. 2016. **Insecticide dip treatments to prevent walnut twig beetle colonization of black walnut logs.** Forest Products Journal 66: 233-240.
2. Chaires-Grijalva, M. Patricia, Edith G. Estrada-Venegas, Armando Equihua-Martinez, John C. Moser, and Stacy R. Blomquist. 2016. **Trophic habits of mesostigmatid mites associated with bark beetles in Mexico.** J. Acarol. Soc. Jpn. 25(S1): 161-167.
3. Fraedrich, S.W., T.C. Harrington, B.A. McDaniel, and G.S. Best. 2016. **First report of laurel wilt, caused by *Raffaelea lauricola*, on spicebush (*Lindera benzoin* (L.) Blume) in South Carolina.** Plant Disease (in press).
4. Miller, D.R., J.D. Allison, C.M. Crowe, D. Dickinson, R.W. Hofstetter, A.S. Munson, T.M. Poland, L. Reid, B.E. Steed, and J.D. Sweeney. 2016. **Pine sawyers (Coleoptera: cerambycidae) attracted to a-pinene, monochamol and ipsenol in North America.** J. Econ. Entomol. 109:1205-1214.
5. Olatinwo, R., C. Barton, S. W. Fraedrich, W. Johnson, and J. Hwang. 2016. **First report of laurel wilt, caused by *Raffaelea lauricola* on sassafras (*Sassafras albidum*) in Arkansas.** Plant Disease Note. Accepted June 8, 2016.
6. Pureswaran, Deepa S., Richard W. Hofstetter, Brian T. Sullivan, Amanda M. Grady, and Cavell Brownie. 2016. **Western pine beetle populations in Arizona and California differ in the composition of their aggregation pheromones.** J. Chem. Ecol. Doi: 10.1007/s10886-016-0696-9.

Submitted Publications (in review):

1. Aubrey, Doug P., S.W. Fraedrich, T.C. Harrington, and R. Olatinwo. **First record of *Cristulariella moricola* associated with foliar blight of Camden white gum (*Eucalyptus benthamii*), a bioenergy crop.** Biomass and Bioenergy (submitted).
2. Brantley, S.T., A.E. Mayfield III, R.M. Jetton, C.F. Miniati, D.R. Zietlow, C. Brown, and J.R. Rhea. **Elevated light levels reduce hemlock woolly adelgid infestation and improve carbon balance in eastern hemlock seedlings.** New Phytologist (in review).
3. Seibold, S., C. Bassler, P. Baldrian, L. Reinhard, S. Thorn, M. Ulyshen, I. Weiss, and J. Muller. **Species groups of non-saproxyllic epigeal taxa respond differently to dead-wood addition and canopy openness.** Biological Conservation (submitted).
4. Wiggins, G.J., J.F. Grant, J.R. Rhea, A.E. Mayfield, A. Hakeem, P.L. Lambdin, and A.L. Galloway. **Trapping methods to assess emergence, populations, and hybridization of *Laricobius nigrinus*, an introduced predator of hemlock woolly adelgid, in the Southern Appalachians.** Environmental Entomology (in review).

Presentations and Lectures:

1. Billings, Ron, Bill Upton, Larry Spivey, and Rabiou Olatinwo. 2016. **Duration of BotaniGard (*Beauveria bassiana*) for Southern Pine Beetle (SPB) Control under East Texas Conditions.** East Texas Forest Entomology Seminar April 21-22, 2016. Oral presentation.
2. Brantley, S., A. Mayfield, R. Jetton, C. Miniati, D. Zietlow, C. Brown, and R. Rhea. 2016. **Elevated light levels reduce HWA infestation and improve carbon balance in eastern hemlock seedlings.** North American Forest Insect Work Conference, 2 June 2016, Washington, DC (poster).
3. Castrillo, L., J. Vandenberg, M. Griggs, R. Camp, A. Taylor, B. Mudder and A. Mayfield. 2016. **Walnut twig beetle mortality and reduced brood production following exposure to commercial strains of entomopathogenic fungi *Beauveria bassiana* and *Metarhizium brunneum*.** North American Forest Insect Work Conference, 1 June 2016, Washington DC (poster).

4. Heminger, A., A. Mayfield, G. Wiggins, J. Grant, J. Elkinton, T. McAvoy, A. Tait, J. Lombardo, B. Mudder, and S. Salom. 2016. **Impact assessment of *Laricobius nigrinus* (Coleoptera: Derodontidae), a predator of hemlock woolly adelgid.** North American Forest Insect Work Conference, 1 June 2016, Washington DC (poster).
5. Lapham, M., C. Miniati, A. Mayfield, R. Jetton, D. Zietlow, S.T. Brantley, and R. Rhea. **Shade and Infestation Affect Eastern Hemlock Nutrient Content.** North American Forest Insect Work Conference, 2 June 2016, Washington, DC (poster).
6. Mayfield, A. 2016. **Pesticides, Predators, and Patch Cuts: Persistent Peril or Possible Promise for the Prized Eastern Hemlock?** Save Georgia's Hemlocks Camp Meeting, 5 June 2016, Ellijay, GA. (Invited, oral).
7. Mayfield, A. 2016. **What's New in Hemlock Woolly Adelgid Biological Control.** Pisgah National Forest, Grandfather Ranger District, CFLR Restoration Project Quarterly Meeting, 27 April 2016, Asheville, NC (invited, oral).
8. Mayfield, A., J. Smith, S. Fraedrich, J. Riggins, M. Hughes, and J. Hanula. 2016 **Impacts of the redbay ambrosia beetle (*Xyleborus glabratus*) and the laurel wilt pathogen in the Southeastern USA.** North American Forest Insect Work Conference, 3 June 2016, Washington DC (invited, oral).
9. 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, J.D. Sweeney. 2016. **Pine sawyers, *Monochamus* species (Cerambycidae) attracted to α -pinene, monochamol and ipsenol in North America.** North American Forest Insect Work Conference 2016, Washington, DC. (poster).
10. Miller, D.R., C.M. Crowe, J.D. Sweeney. 2016. **Effect of trap height on catches of bark and wood boring beetles in a stand of white oak and shortleaf pine in Georgia.** North American Forest Insect Work Conference 2016, Washington, DC. (poster).
11. Miniati, C.F., Brantley, S.T., Zietlow, D.R., Mayfield, A.E., Rhea, R., Jetton, R. and Arnold, P. 2016. **Physiological responses of eastern hemlock (*Tsuga canadensis*) to biological control and silvicultural release: implications for large-scale hemlock restoration.** North American Forest Insect Work Conference, 1 June 2016, Washington DC (poster).
12. Olatinwo Rabiou and Stephen Fraedrich. 2016. **Laurel wilt: beyond the redbay (*Persea borbonia* (L.) Spreng) native range.** The 6th North American Forest Insect Work Conference (NAFIWC), Washington D.C., May 31 - June 3, 2016. Oral presentation.
13. Olatinwo Rabiou, Wood Johnson, and Timothy D. Schowalter. 2016. **Multigene sequence analyses of *Amylostereum areolatum* (Russulales: Amylostereaceae) symbiont associated with native *Sirex nigricornis* Fabricius (Hymenoptera: Siricidae).** The 6th North American Forest Insect Work Conference (NAFIWC), Washington D.C., May 31 - June 3, 2016. Poster presentation.
14. Shepherd, W. P. and B. T. Sullivan. 2016. **Effects of volatiles from decaying pines on attraction of three southern *Ips* species.** The 6th North American Forest Insect Work Conference, Washington D.C., May 31 - June 3, 2016 (poster).
15. Sweeney, J.D., P.J. Silk, R.P. Webster, D.R. Miller, C. Hughes, K.L. Ryall, J.M. Gutowski, T. Mokrzycki, J.A. Francese, Q. Meng, Y. Li. 2016. **Efficacy of detecting bark- and wood boring beetles (Cerambycidae, Buprestidae, Scolytinae) is improved by using a mix of trap colors and trap placements.** North American Forest Insect Work Conference 2016, Washington, DC. (poster).
16. Ulyshen, Michael D., Scott Horn, Michelle Cram, Steve Fraedrich and Rabiou Olatinwo. 2016. **Are insects (and/or pathogens) contributing to sugarberry mortality in Georgia and South Carolina?** The 6th North American Forest Insect Work Conference (NAFIWC), Washington D.C., May 31 - June 3, 2016. Poster presentation.
17. Wallin K.F., A. Arsenault-Benoit, S. Gaimari, N.P. Havill, A.E. Mayfield, D.W. Ross and M.C. Whitmore. 2016. **Establishment, reproduction and impact of silver fly (*Leucopis* spp.) predators under field conditions near the leading edge of the HWA range in the eastern United States.** North American Forest Insect Work Conference, 2 June 2016, Washington DC (invited, oral).
18. Whittier, W.A, A.E. Mayfield III, and R.M. Jetton. 2016. **Silvicultural and Integrated Pest Management Strategies for Restoring Eastern Hemlock to Degraded Southern Appalachian Mountain Ecosystems.** Gene Conservation of Tree Species Workshop 16-19 May 2016, Chicago, IL (poster).

Other:

1. In May 2016, Southern Regional Extension Forestry launched a new Forest Health website at <http://southernforesthealth.net/>. This new multi-agency, multi-state resource hub provides information about native and invasive insects, plants, and fungi in southeastern U.S. forests and was supported by funds from the USDA Forest Service FHP Southern Region.



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>