Southern Forest Health

Research and Management Update

Summer 2017

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This newsletter is a joint publication of:

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Science and Program Highlights

SPB Activity Erupts on the National Forests in Mississippi…Yet Again

Southern pine beetle detection flights in May and early June identified hundreds of active SPB spots on the Bienville (642 spots), Homochitto (547 spots) and Tombigbee (362 spots) National Forests in Mississippi (NFMS). Subsequent ground evaluations indicate that the majority of infestations are rapidly enlarging. The vast majority of spots have been located in dense unthinned stands of loblolly pine less than 40 years old. Numerous other active infestations have also been observed on surrounding state, private, and industrial forest lands. Recent detection flights now estimate that there over 920 spots on the Tombigbee/Holly Springs, and 1,648 spots on the Bienville, while the Homochitto was conducting another flight at the time of this writing. Given the lack of markets required to conduct Cut & Remove operations, and the limited resources available for Cut & Leave suppression measures, direct suppression efforts on the NFMS is currently only focusing on halting active spots threatening red-cockaded woodpecker habitat and private property. Limited Cut & Leave operations via chainsaw crews and mechanical operators have begun on all three forests and are expected to ramp up in the coming weeks and months as the situation is now being treated as an Incident. For more information, contact **Jim Meeker** (jrmeeker@fs.fed.us).

Aerial observer's view of active SPB spots on the Bienville National Forest in mid-July. Photo courtesy of Jim Meeker.

Exploring the below- and above-ground effects of coarse woody debris and termites in loblolly pine plantations

A study investigating the importance of coarse woody debris and wood-feeding insects to soil fertility, mycorrhizal diversity and tree growth in loblolly pine plantations in Mississippi will soon be published in the journal Ecosphere. The research was done in collaboration between SRS RWUs 4552 and 4156 and with colleagues at Virginia Tech, the Univeristy of Tokyo, the University of Georgia, the Technical University of Munich, and North Carolina State University. The 51-month field study involved adding different quantities of pine logs to the bases of pine saplings and included a treatment where logs were protected from subterranean termites (see figure next page). At the end of the

(continued on page 2)

Coarse woody debris and termites (continued)

experiment, when the logs were more than half decomposed, microbial biomass, plant-available forms of N and ectomycorrhizal diversity where measured from soil samples taken around the bases of the experimental trees. Elemental concentrations were also measured from samples of wood collected from logs unprotected vs. protected from termites. Finally, the growth (basal stem area and height) and nutritional status (foliar N concentrations) of the experimental trees were measured at the end of the study (see figure). The results indicate that dead wood and termites both contribute to the spatial heterogeneity of soil properties but may have limited short-term and local effects on tree growth. Longer-term studies and studies on less fertile sites are needed to more fully address these questions. For more information, contact **Michael Ulyshen** (mulyshen@fs.fed.us).

Photo caption: Logs unprotected (A) or protected (B) from termites were added at the beginning of the study. Trees were felled at the end of the study to collect growth data (C). Photos courtesy of Mike Ulyshen.

New project aims to develop silvicultural prescriptions to improve hemlock health

A new project initiated by North Carolina State University/Camcore, the USFS Southern Research Station, and USFS Forest Health Protection aims to develop silvicultural prescriptions that release understory eastern hemlocks from overstory shade. A number of recent research studies suggest that hemlocks infested with the invasive hemlock woolly adelgid (HWA) may benefit from elevated levels of sunlight. Building on these findings, the new project will evaluate two different canopy gap sizes and two gap creation methods (felling vs. girdling) on long-term hemlock crown health and competing vegetative response in mixed hemlock/hardwood stands. A primary goal of the project is to validate whether use of silvicultural gaps can be integrated into the overall pest management strategy for hemlock woolly adelgid in eastern North America. The first plots associated with this project were installed on state-managed lands in Maryland and North Carolina in June 2017, and additional sites are being added. For more information, contact Bud Mayfield at amayfield02@fs.fed.us.

An understory hemlock tree (left) released from shaded conditions through creation of a canopy gap, as part of a new silviculture project. Photo courtesy of Bud Mayfield.

In the News

"Kent House Bug Day" another great outreach success!

On June 3, employees from all three branches of the US Forest Service (National Forests, State and Private Forestry, and Research) and their families helped host the 10th Annual "Kent House Bug Day" educational outreach event at the Kent House Plantation in Alexandria, LA. Children and adults alike participated in numerous events including "I Ate a Bug", insect costume contests, live insect encounters, and insect "tattoos." Those who helped to make this outreach event another huge success benefitting children of all ages included **Stacy Blomquist, Kristi Wharton, JoAnne Barrett, Will Shepherd, Brian Sullivan, Jessica McKenney, Wood Johnson,** and **Rabiu Olatinwo**. Thanks Bug Day Team!

Children enjoy the exhibits (left), and Stacy Blomquist of the Kisatchie National Forest leads the insect costume parade (above) at the 10th Annual Kent House Bug Day in Alexandria, LA. Photos courtesy of JoAnne Barrett.

Olatinwo participates in Congressional Briefing Training

Dr. Rabiu Olatiwo of SRS 4552 participated in the Congressional Briefing Training for the USDA Forest Service organized by the Government Affairs Institute at Georgetown University, Washington, DC, June 12-15, 2017.

US Forest Service Kids Fishing Days

Mary Williams of SRS 4552 participated in the Kids Fishing Day at Lake Powhatan on the Pisgah National Forest on June 3, 2017. Kids Fishing Days were hosted in May and June by the Nantahala, Pisgah, Uwharrie and Croatan National Forests and their partners. These free events allow families and friends to share in fun and quality outdoor time together while learning about one of our nation's favorite pastimes.

In Memoriam: Lawrence "Lary" Roton, 1937-2017

We are sad to report that US Forest Service retiree Lawrence "Lary" Roton passed away in June. He was a technician with the SRS Insects, Diseases, and Invasive Plants unit for 47 years, working in the Insectary for much of that time with John Moser. Lary retired in 2008 under the supervision of Brian Strom. Lary was instrumental in compiling a list of mites associated with the Southern Pine Beetle, publishing several papers with Dr. Moser on the subject, and was an authority on leaf-cutting ants, pheromone baits, beetle trapping, and a host of other forestry-insect-related topics. Lary was very creative in finding ways to conduct research, going so far as to allow himself to be used as a test subject! (In studying Pyemotes, a straw-itch mite, Lary volunteered to allow the mites to take a blood meal off of his arm!). Lary would also dumpster-dive to find the necessary resources he needed to conduct his experiments. For those of you who knew Lary, this is not surprising – he was dedication personified. When he was not at work, Lary could be found fishing and hunting. He was an avid quail hunter and took pride in his well-trained bird dogs. He was deeply in love with his wife of 50+ years, Sara, and had three beautiful daughters, numerous grandchildren, and a son who preceded Lary in death. (*Tribute written by Stacy Blomquist*)

Staff Changes

SRS 4552 welcomes Dr. JT Vogt as Project Leader

James T. (JT) Vogt is very pleased to be the new Project Leader for Southern Research Station Work Unit 4552 (Insects Diseases and Invasive Plants of Southern Forests). He completed his B.S. at Tusculum College in Greeneville, TN, majoring in Biology. He went on for his MS at The University of Tennessee, Knoxville, where he studied chloropid flies in tall fescue. He then attended Auburn University, earning his Ph.D. in Arthur Appel's laboratory working on respiratory physiology and energetics of imported fire ants and also gaining experience in chemical control of pest insects. Following a 2-year postdoc at Oklahoma State University as Fire Ant Research and Education Specialist, he joined the USDA Agricultural Research Service where he worked on biological control of imported fire ants and remote sensing for fire ant mound detection. He spent a couple years in industry as a Technical and Quality Control Director for a pest management company, then got back into Federal service as Deputy Program Manager for Southern Research Station Forest Inventory and Analysis (FIA). During his 6 years with FIA, he continued to be active in research, working with The University of Tennessee on a collaborative project designed to increase knowledge of tick abundance and seasonal incidence across the south, exploring the potential of FIA data to answer regional questions about hemlock woolly adelgid impact, and exploring the effects of altering cycle length and sample size (in response to changing budgets) on estimators for FIA. He is very happy to be returning to a position that is more focused on solving pest problems (insect, disease, and invasive plants). In his spare time JT likes to spend time fishing, camping, and exploring new places with his wife Karen and kids Samantha and James. Other hobbies include attending concerts, traditional archery, and collecting antique fishing equipment. He also welcomes opportunities to share his enthusiasm for insects and entomology with students from elementary school through college. JT can be reached at (865) 978-0664.

Brian Strom to detail as FHP Field Representative in Pineville, LA

Dr. Brian Strom will detail as the acting Field Office Representative for Forest Health Protection (FHP) at the Alexandria Field Office in Pineville, LA. Brian is currently a Research Entomologist with SRS 4552 and a frequent project collaborator with FHP staff in the Southern Region. His 120-day detail with FHP begins July 23rd. Congrats Brian!

Technology Transfer

Publications (in print/press):

1. Aubrey, D.P., **S.W. Fraedrich**, T.C. Harrington, and **R. Olatinwo**. ***Cristulariella moricola* associated with foliar blight of Camden white gum (*Eucalyptus benthamii*), a bioenergy crop**. Biomass and Bioenergy (In press - https://doi.org/10.1016/j.biombioe.2017.07.001).
2. **Meeker, J.R**., C.A. Steiner, A.L. Greis, and J.T. Nowak. 2017. **Key Findings of the 2016 SPB Outbreak on the National Forests in Mississippi.** Infographic. R8-FHP, Atlanta, GA. 1 p.
3. **Miller D.R., C.M. Crowe**, P.D. Mayo, P.J. Silk, L. Reid, and J.D. Sweeney. 2017. **Interactions between ethanol, hexanediol and hydroxyketone lures on trap catches of hardwood woodborers in southeast USA**. J. Econ. Entomol. In press. DOI: https://doi.org/10.1093/jee/tox188.

Submitted Publications (in review):

1. Castrillo, L.A., **A.E. Mayfield III**, M.H. Griggs, R. Camp, **B. Mudder**, A. Taylor, and J.D. Vandenberg. 2017. **Mortality and reduced brood production in walnut twig beetles, *Pityophthorus juglandis* (Coleoptera: Curculionidae), following exposure to commercial strains of entomopathogenic fungi *Beauveria bassiana* and *Metarhizium brunneum***. Biological Control (in review).

2. Chase K.D., L.D. Stringer, R.C. Butler, A.M. Liebhold, **D.R. Miller**, and E.G. Brockerhoff. 2017. **Multiple-lure surveillance trapping for Scolytinae, Cerambycidae and brown marmorated stink bug**. J. Pest Sci.

Presentations and Lectures:

1. Audley, J., S.W. Myers, A. Taylor, W.E. Klingeman, **S.W. Fraedrich**, **P. Merten**, R. Camp, and **A.E. Mayfield III. Phytosanitary wood treatments for TCD and nursery stock colonization by the walnut twig beetle.** Thousand Cankers Disease Research & Management Operational Meeting, 14 June 2017, Lafayette, Indiana (Mayfield presenting).
2. Castrillo, L.A. J.D. Vandenberg, M.H. Griggs, A. Taylor, J. Juzwik, R. Camp, **B. Mudder**, and **A.E. Mayfield III**. 2017. **Susceptibility of the walnut twig beetle to pathogenic fungi.** Thousand Cankers Disease Research & Management Operational Meeting, 14 June 2017, Lafayette, Indiana (Mayfield presenting).

3. Cunard, C.E., K.S. Burgess, J. Gravesande, T.D. Marsico, J.N. Reed, L. Whitehurst, and **R.D. Lucardi.** 2017. **Exotic plant prevention: Assessing the invasion risk associated with shipping containers entering the Port of Savannah**. Florida Exotic Pest Plant Council Meeting, April 2017, Melbourne, FL. [Oral]
4. Gravesande, J., C.E. Cunard, K.S. Burgess, T.D. Marsico, J.N. Reed, L. Whitehurst, and **R.D. Lucardi**. 2017. **Investigating changes in composition of the exotic plant community entering the Port of Savannah**. Florida Exotic Pest Plant Council Meeting. April 2017. Melbourne, FL. [Student Poster]
5. Jetton, R.M. and **A.E. Mayfield III**. 2017. **Silvicultural options for the restoration of eastern hemlock in the southern Appalachian Mountains.** Presentation at the East Texas Forest Entomology Seminar, April 20-21, Nacogdoches, TX.
6. Marsico, T.D., J.N. Reed, C.E. Cunard, L. Whitehurst, K.S. Burgess, and **R.D. Lucardi**. 2017. **International shipping ports as zones of inquiry for the release and maintenance of exotic plant species**. BOTANY 2017, June 2017, Fort Worth, TX. [Oral]
7. **Mayfield, A.E., III.** 2017. **Vascular Wilt Diseases**. Lecture to the Forest Health course, Dept. of Forestry & Environmental Resources, North Carolina State University, 12 April 2017, Raleigh NC.
8. **Mayfield, A.E., III.** 2017. **Hemlock woolly adelgid management in the southern Appalachians: is there hope?** "Greenline" Meeting of the USDA Forest Service Southern Research Station and the National Forests of North Carolina and South Carolina, 26 April 2017, Asheville, NC.
9. **Mayfield, A.E., III.** 2017. **Forest entomology and pathology lectures and field trip**. National Advanced Silviculture Program - Mountain Module. Bent Creek Experimental Forest, 18 May 2017, Asheville, NC.
10. **Miller, D.R., C.M. Crowe**, and J.D. Sweeney. 2017. **Effect of trap height on catches of bark and wood boring beetles in a stand of white oak and shortleaf pine in Georgia**. Western Forest Insect Work Conference, Jackson WY. (Poster)
11. **Miller, D.R., C.M. Crowe,** M.D. Ginzel, C.M. Ranger, and P.B. Schultz. 2017. **Comparing bottle traps to multiple-funnel traps for ambrosia beetles**. Western Forest Insect Work Conference, Jackson WY. (Poster)
12. **Miller, D.R., C.M. Crowe**, P. Silk, P. Mayo, and J.D. Sweeney. 2017. **Attraction of non-cerambycids to cerambycid pheromones in southeastern USA.** Western Forest Insect Work Conference, Jackson WY. (Poster)
13. **Miller, D.**, K. Dodds, and J. Sweeney. 2017. **Factors affecting catches of hardwood borers – Opportunities for changes in detection programs for exotics.** Western Forest Insect Work Conference, Jackson WY. (Talk)
14. Schulz, A.N., **R.D. Lucardi**, and T.D. Marsico. 2017. **The forgotten fourth trophic level: Natural enemies influence the success or failure of non-native invaders and biological control agents.** BOTANY 2017, June 2017, Fort Worth, TX. [Oral]
15. Schulz, A.N., **R.D. Lucardi,** and T.D. Marsico. 2017. **The quest for common ground: An evaluation of communication effort between the fields of invasion ecology and biocontrol using bibliometric analysis.** BOTANY 2017, June 2017, Fort Worth, TX (Poster).
16. Schulz, A.N., **R.D. Lucardi**, and T.D. Marsico. 2017**. Who cites whom? Communication insights from a bibliometric analysis of invasion and biological control literature**. The 101st Annual Meeting of the Academy, Arkansas Academy of Sciences, April 2017, Conway, AR. [Oral]
17. Sweeney, J., P. Silk, P. Mayo, R.P. Webster, **D.R. Miller**, C. Hughes, **C. Crowe**, K. Ryall, J.M. Gutowski, T. Mokrzycki, J. Francese, Q. Meng, Y. Li, and T. Kimoto. 2017. **Detection of bark- and wood-boring beetles is increased by using a diversity of trap colors and heights and decreased by Z-3-hexenol**. Western Forest Insect Work Conference, Jackson WY. (Poster)

Participants in the 2017 Western Forest Insect Work Conference, Jackson, WY.
Photo by Bill Ciesla, submitted by Dan Miller.

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