Director's Report

First of all, I would like to welcome two new members to the Forest Health Cooperative: The Westervelt Company and ArborGen! It has been a few months since our last newsletter and I hope that everyone is having a productive year. Something that many may be interested in is the new seminar series at the School of Forestry and Wildlife Sciences. Each semester there are 13 one-hour seminars on various forestry and wildlife topics in which 1 hour of CFE is granted. It is open to anyone who wants to attend and has no fee. Seminar is held on Tuesdays at 11 a.m. in room 1101. Parking is available in the gravel lot on the corner of Lem Morrison & Donahue Drive. If you have foresters in the area who would like to participate, please e-mail me at eckhalg@auburn.edu for a schedule of topics.

Membership

Rebecca and I have been approaching several companies and consulting firms in the southern U.S. about joining the Forest Health Cooperative. We have shared our membership materials with them and answered a few questions concerning membership. The Forest Health Cooperative currently has 8 Full Members, 4 Associate Members and 7 Sustaining Members.

Advisory Meeting

The Advisory Meeting is scheduled for Wednesday and Thursday, November 17 and 18, 2010 at the School of Forestry and Wildlife Sciences Building at Auburn University in Auburn, Alabama. The Forest Health Cooperative staff is in the process of updating our accomplishments, the budget and next year's work plan. If you have any ideas or items that your organization would like addressed, please let me know. We will begin the meeting after lunch on Wednesday and adjourn around noon on Thursday. Please place those days on your calendar and more information will be available shortly.

New Additions

Ben Brunson -- Hello, my name is Ben Brunson. I am currently a graduate student under Dr. Lori Eckhardt. My project focuses on the effects of cogongrass on the populations of root-feeding bark beetles in loblolly and longleaf pine ecosystems. I received my bachelor's degree in forestry from Auburn University in May of 2010. I also received an associate's degree from Enterprise-Ozark Community College in 2007.

My hometown is Hartford, Alabama, which is located approximately twenty miles south of Enterprise. As you may know, agriculture is a big part of the economy and lifestyle of this area. Having much of my family involved in farming, I grew a deep appreciation of the outdoors. I am an avid hunter of mostly small game such as dove and squirrel, so much of my spare time was spent walking through forests and fields surrounding my home. I also enjoy fishing on the local rivers and ponds of my hometown. It is through my passion for the outdoors that I was drawn to the field of forestry. I realized that through the practice of forestry and related conservation fields that our forests and surrounding ecosystems are made usable and sustainable for current and future populations of not only humans, but also the populations of wildlife that inhabit them.

During my career here at Auburn University, I have worked with the Auburn Fisheries Unit as a kudzu eradication technician and general worker, as well as a student worker for the Forest Health Dynamics Laboratory. I have also worked for various small businesses around my hometown including a produce stand, boat manufacturing and sales company, and an awning manufacturing

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Call Us!

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What's Inside?

Featured Disease

Annosus Root and Butt Rot caused by *Heterobasidion irregulare* (formerly *Heterobasidion annosum*)

Still known to many as "Fomes Root Rot," it is a commercially important disease of conifers and all southern pines are susceptible. Loblolly and slash pine are more severely affected.

Conks are often present in the litter at the base of dying and dead trees or tree stumps, or under root masses of wind thrown trees. Conks are tan to brownish on the upper surface with a white margin and are white with tiny pores on the lower surface, when fresh. They are tough and rubbery. In the southern U.S., conks are usually seen from December to March.

Damage may be scattered throughout a stand or in pockets of dead and dying pine trees called "infection centers." Mortality is sometimes preceded by thinning and yellowing of the crown, however, some trees simply turn red and die. Trees in various stages of dying or death may suffer windthrow. Infected roots exhibit resin or pitch-soaking and stringy root decay.

Annosus probably enters the stand when spores land on fresh cut stumps during a thinning operation. The fungus grows through the remaining root system into nearby live trees via root grafts or contacts. Mortality usually begins 2 to 3 years after thinning and often ceases 5 to 7 years later. Damage increases with the sand content of the soil.

Prevention and control strategies for annosus root rot include stump treatment, timing of thinning, prescribed burns, and the manipulation of planting density.

Reference: USDA Forest Service. 1997. Insect and Diseases of Trees of the South.. Protection Rep. R8-PR 16. p. 84

Nancy's Noxious Weeds *by Nancy Loewenstein*

Featured Weed: Japanese Stiltgrass (*Microstegium vimineum*)

Japanese stiltgrass (*Microstegium vimineum*) is spreading and can now be found in much of the state. Native to temperate and tropical Asia, this shade-tolerant, annual grass is also known as Nepalese browntop, bamboo grass, Chinese packing grass and eulalia. It is most often found along streams in the understory of moist forests, but is increasingly found in forest edges, roadsides, trail sides, damp fields, ditches and in lawns. I have also seen it growing in pine plantations and in maritime forests just a few miles from the beach.

Figure 1. Leaves typically have a silvery, off-center midrib.

Typically ranging between 1-3 feet in height, the plants have wiry, ascending or sprawling stems that branch near the ground. Aerial roots which look a bit like stilts descend from the lower nodes. This may be the origin of the common name 'stiltgrass'. The leaves are alternate, 1-4 inches long and shaped like a narrow football. The leaf midrib is off-center and typically silvery white. Flowering occurs during the late summer through the fall on thin stems which extend beyond the leaves. The thin, spikelike flowers are 1 to 3 inches long and are usually unbranched but may have a few lateral branches. Hundreds of seeds, which can remain viable for three years in the soil seed bank, are produced by each plant. The small seeds are spread by flood water, and by hitchhiking on animal fur or on the clothes and boots of people passing by.

Often growing in extremely dense infestations, Japanese stiltgrass can create a thick ground cover that displaces native vegetation and hampers overstory regeneration. Infestations also increase soil pH and alter nutrient cycles. Japanese stiltgrass has little if any wildlife value.

Figure 2. Infestation

Small infestations of Japanese stiltgrass can be controlled by pulling. Despite the 'extra' aerial roots, plants can be pulled very easily. (This trait can also help with identification.) Mowing and weed-whacking late in the summer is effective, but must be done before seeds set yet late enough that the plants don't have time to produce another set of flowers. While glyphostate and other systemic herbicides will control Japanese stiltgrass, herbicides containing imazapic may be preferred as they also control Japanese stiltgrass but have less impact on many desirable native plants.

References:

Miller, J.H., Chambliss, E. B. and Loewenstein, N.J. 2010. A Field Guide for the Identification of Invasive Plants in Southern Forests. Gen. Tech. Rep. SRS-119. Asheville, NC: USDA Forest Service, Southern Research Station, 126 p. http://www.treesearch.fs.fed.us/pubs/35292

Kaufman, S.R. and Kaufman, W. 2007. Invasive Plants - Guide to Identification and the Impacts and Control of Common North American Species. Stackpole Books, 458 p.

Invasive and Exotic Species of North America - http://www.invasive.org/species/subject.cfm?sub=3051

Figure 2. Japanese stiltgrass is not very drought tolerant and may die back during prolonged dry spells.

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facility. I would like to thank the Forest Health Cooperative for helping me achieve my goals of expanding my knowledge of forest health information so that I can be a successful forester and conservationist in my career.

Mathew (Matt) Meyerpeter -- Greetings! My name is Matt Meyerpeter and I am a new graduate student at Auburn University, studying for a Master of Science in Forestry under Dr. Lori Eckhardt. My research consists of the study of *Pinus oocarpa*, a native pine to Nicaragua, and the rapid decline and mortality of the species associated with beetle vectors and pathogenic fungi. I am also working on an ArcGIS project for loblolly pine decline in the southeast U.S. using FHM/FIA data. This data will be used to create a map of current loblolly pine decline, high risk sites for decline, and to facilitate in predicting future decline of the species that covers much of the southeastern U.S.

I am originally from Columbia, MO and earned my BS in Forestry from The University of Missouri. Post-graduation, I took a job with a private timber management company in MO where I put my forestry skills to use managing timber and wildlife habitats. I learned a great deal through on-the-job training and built a solid foundation for what I hope to be a long and enjoyable career in forestry. I eventually found myself desiring a new challenge in forestry and attended the Alabama Forestry Association Mid-Winter Conference in early 2010 to explore some options. It was there that I met Dean Richard Brinker and he suggested that I give Auburn University a look should I entertain graduate school. I soon decided to give Auburn a look; intrigued and inspired by what I saw, I wanted graduate school and a research assistantship to be the next step in my forestry career.

I am very excited to be at Auburn University and owe many thanks to the Forest Health Cooperative for making my time here very beneficial and possible.

Amritpal Singh -- Geetings! I am Amritpal Singh, a new graduate student in the Forest Health Dynamics Laboratory. I was born and brought up in Punjab State, the agricultural hub of India. My rural background and interest in agriculture since childhood encouraged me to choose agriculture as my professional career. So, I completed my BS in agriculture at Punjab Agricultural University Ludhiana in 2009. At this point I felt that there is a great need to protect our degrading environment. Issues like global warming, deforestation and climate change are taking a toll on our environment. Forests have a direct impact on the environment. Conserving forests, tree species, and diversity is a means to save our environment. Keeping in mind the present scenario, I made an important decision in my life to pursue my higher studies in forest health.

During my MS in the School of Forestry and Wildlife Sciences at Auburn University, I will work with the Forest Health Cooperative, Forest Health Dynamics Laboratory, Southern Forestry Nursery Management Cooperative for fulfillment of my research project. This project will explore the families of loblolly and slash pine to determine which are resistant to *Ophiostoma* and *Leptographium* species of fungi. These fungi cause major damage to pines and have a complex association with bark beetle species. The study will help give land managers a choice of which family to plant at particular sites or areas at risk for diseases.

It is a matter of pleasure and prestige for me to work in this different, research-oriented environment, replete with new social and academic challenges. I love playing and exercise during my leisure. I found college football very interesting. In a short span, I have become a fan of this game. I am a member of Paryavaran (Environment) Welfare Society in India. The society makes efforts to save the environment by planting trees in public places. It also organizes free medical camps in villages to help the poor. I look forward to working in my new position in an efficient way with the members of the Forest Health Dynamics Laboratory, faculty and staff.

Guest Articles

Fertilizer and Consequences for Trees

(By Joseph Heckman, Ph.D., Specialist in Soil Fertility, in Rutgers Cooperative Extension, Plant and Pest Advisory, Landscape, Nursery & Turf Edition, May 6, 2010)

Conventional thinking assumes that fertilization of trees increases their ability to ward off insects, disease, and stress, but research by Dr. Daniel Herms at The Ohio State University, suggests otherwise.

(http://www.ohio4h.org/~news/story.php?id=2442)

The nutritional quality (protein content) of host plants is usually a limiting factor in the growth and survival of insects. Fertilization increases the nutritional value of the tree as food for insects. For example, on fertilized trees, gypsy moth larvae have been observed to grow 49% faster and eastern tent caterpillar 530% faster.

There is a trade-off between tree growth rate and defense against pest attack. While fertilization does increase the growth and may enhance aesthetic quality of trees, scientific evidence shows that fertilization almost always decreases tree resistance.

In addition to enhancing the nutritional quality of the plant to the feeding insects, fertilization decreases the concentrations of plant defensive compounds. Alkaloids (nicotine), terpenes, phenols (flavonoids, lignin, tannins), and cyanide are examples of defensive chemicals that become less concentrated in plant tissue when trees are given fertilizer.

Tree fertilization also increases the shoot/root ratio. Increasing shoot growth while decreasing the proportion of root growth, adds to the trees water requirement while reducing tree capacity to acquire water. Consequently, fertilized trees may be more susceptible to drought.

Nevertheless, fertilization may have a role in a plant health care program, especially in high maintenance landscapes. Caretakers, however, should be aware of potential consequences of fertilizer on pest resistance and stress tolerance in trees.

Urban landscapes are often plagued with soil compaction. Besides fertilization, efforts to improve tree health should focus on preventing soil compaction or remediating soils that are already compacted.

Potential Kudzu Biocontrol Identified in Georgia
(UGA release, 11/6/09 via Chemically Speaking, Jan. 2010)

Researchers from the University of Georgia and Dow AgroSciences have identified a kudzu-eating pest in northeast Georgia that has never been found in the Western Hemisphere. Unfortunately, the bug also eats legume crops, especially soybeans. The bug has tentatively been identified as the bean plataspid (Megacopta cribraria), a native to India and China. It is pea-sized and brownish in color with a wide posterior, said Dan Suiter, an entomologist with the UGA College of Agricultural and Environmental Sciences (and former UF graduate). "It kind of waddles when it walks on a surface, but it flies really well," he said.

It's also commonly called lablab bug and globular stink bug. Like its distant cousin the stink bug, when threatened, it releases a chemical that stinks. Suiter and CAES diagnostician Lisa Ames first saw the pest when samples were sent to them in mid-October from UGA Cooperative Extension agents and pest control professionals in Barrow, Gwinnett and Jackson counties. Samples have since arrived from Clarke, Hall, Greene, Oconee and Walton counties.

Homeowners first reported the pest after finding large groups of the bugs lighting on their homes. "At one home in Hoshton, GA, we found the bugs all over the side of a lady's house," Suiter said. "There is a kudzu patch behind her home that provides food, and they were attracted to the light color of the siding. At this time of year, the insects are most active in the afternoon when it gets warm." In addition to homes, the bug is attracted to light-colored vehicles.

Suiter believes the bug arrived here by accident. "We do have the world's busiest airport here, but we'll never know how the bug first got here," he said. "When it found kudzu here, it found a food source, and it doesn't have any natural enemies here that we are aware of." The pest's population is currently contained to northeast Georgia. It's an invasive species feeding on an invasive species."

Introduced to the U.S. in 1876 from Japan, kudzu was planted in the 1930s to control soil erosion. It now tops the nation's invasive species list. "We have no idea what the long-term impact on kudzu will be, but we also have to consider the fact that it feeds on crops, too," he said. "It's kind of a double-edged sword. It eats kudzu, which is good, but it also stinks and gets on homes. And the ominous threat is that it eats soybeans and other legume crops."

Miscellaneous

Disease Clinic

The Forest Health Cooperative Staff saw a variety of issues this past year in the laboratory. The most frequent repeat occurrence was blue-stain fungi and root-feeding insect damage in loblolly pine roots. If you have any questions about the identification and management of these issues, be sure to check the Forest Health Cooperative web page or just give us a call.

Here is a list of the problems we were involved in during 2010:

1. Pine decline – blue-stain fungi and Hylastes feeding in loblolly pine roots
2. Pine decline – blue-stain and Hylastes feeding in longleaf pine roots
3. Annosus Root Disease
4. Tip Moth
5. Pine Sawfly
6. Pine Shoot Borer
7. Seiridium Canker of Leyland Cypress
8. Neoclytus scutellaris
9. Slim flux
10. Hickory Borer
11. Horned Oak Gall
12. Diplodia on pine

Featured Insect

Ips Engraver Beetles

Ips avulsus (Eichhoff), *grandicollis* (Eichhoff), *calligraphus* (Germar)

I have received many calls recently from homeowners and forest industries regarding bark beetles attacking pine. A closer look often reveals that the trees had been or were being attacked by the Ips engraver beetle, *Dendroctonus* spp. This is possibly due to the trees being stressed by the previous years of drought.

Ips beetles kill more pine timber in the South than any other forest insect, with the exception of the southern pine beetle, *Dendroctonus frontalis*. *Ips* usually attack injured, dying or recently felled trees and fresh logging debris. Infestations are particularly common in trees weakened by drought or lightning strikes.

The adult insect is dark red-brown to almost black in color and 1/8 inch to ½ inch in length. They are distinguished from other bark beetles by their scoped out posterior with 4 to 6 spines on each side. Full grown larvae are white with an orange-brown head and are legless. Pupae are about the same size as the adult and waxy-white.

The female beetle constructs egg galleries and lays her eggs beneath the bark. The larvae make individual feeding galleries in the inner bark and pupate at the end of their gallery. New adults emerge after 25 to 40 days during the summer and several months during the winter.

The first signs of attack are reddish-brown boring dust in bark crevices or reddish-brown pitch tubes about the size of a dime on bark surfaces. If the bark is removed, there are Y- and H-shaped egg galleries with short larval galleries extending perpendicular to them. Egg galleries will usually be free of boring dust. The foliage of *Ips*-killed pines will eventually turn yellow, and then red about the time the beetles complete development under the bark. Often only the top portion of the crown is killed, leaving lower branches green. Bule-stain fungi, introduced when the beetles attack the tree, is visible in the sapwood and hasten the death of the trees.

The best control is prompt removal and utilization of actively infested trees, making sure that the bark and slabs are destroyed. Insect parasites and predators, woodpeckers, and weather provide natural controls. Chemical control is seldom warranted under forest conditions, but may be used to protect pines in urban or high value areas. Preventive control practices include minimizing logging damage to residual stands and quick removal of felled trees.

Reference: USDA Forest Service. 1997. Insect and Diseases of Trees of the South. Protection Rep. R8-PR 16. p. 46

Thought You Might Be Interested To Know…

Emerald Ash Borer Reported in East Tennessee

In July, an infestation of EAB was discovered in Tennessee near a truck stop on an interstate highway. According to the Tennessee Division of Forestry, the EAB posses a significant threat to the 261 million ash trees on public and private lands. It is expected that the Tennessee Department of Agriculture and the Animal Plant Health Inspection Service will issue quarantine's on the movement of firewood, ash nursery stock and ash timber.

Emerald ash borers can kill healthy trees. The adults are one-half inch in length and dark green. They fly from April to September (depending on temperature). Larvae spend the rest of the year beneath the bark and emerge as adults the following spring leaving D-shaped exit holes in the bark.

Picture by D. Cappaert.

Additional information can be found at: http://www.na.fs.fed.us/spfo/pubs/pest_al/eab/eab.pdf

Research Results

***Hylastes* Population Dynamics and Forest Health Evaluation in Association with Thinning and Fertilization**

by Lori Eckhardt

Thinning and fertilization are two of the most common stand management techniques in agroforestry. The effect of stand management on the population dynamics of bark beetles is largely unknown. Stand managers have thinning and fertilization goals for increasing stand growth but whether these goals will cause an increase or decrease in the pest insect populations is unknown or not considered. Thinning ultimately increases tree growth by reducing water and nutrient competition between trees. Fertilization ultimately increases tree growth by replacing deficient nutrients necessary to increase photosynthetic capacity. Thinning can reduce the susceptibility of trees to beetle attacks by increasing tree health and oleoresin pressure. Fertilization can have similar results to that of thinning. Thinning and fertilization can increase the susceptibility of trees to beetle attacks by causing or increasing stress. Stressors can include physical damage to the tree's bole or roots from the thinning process or by reallocation of defensive resources by providing excess nutrients. This study sought to look at the relationship between thinning and fertilization and population dynamics of *Hylastes* spp.

The Forest Nutrition Cooperative has established eight loblolly pine plots on property owned by the Westervelt Company in Tuscaloosa Co., AL (part of the RW-19 study). The site is located on at least 100 ac which had no fertilization in the last four years. The trees on each plot are at least 4in DBH, 10-15 years old, and 35-45 ft in height. Each plot has a split plot design with four subplots. Each subplot corresponds to a separate thinning treatment. The thinning treatments are 100, 200, 300, and 500 stems per acre. Four plots have received a fertilizer treatment of 150-200 lbs N/ac + 25 lbs P/ac. The remaining four plots received no fertilization treatment. Forest Inventory Analysis plots were established within each of the Nutrition Coop subplots. Data collected in each subplot consisted of crown health, insects, roots and resin.

During the study period 2008-2010 there were a total number of 97,878 bark beetles captured. The most significant species being *Hylastes salebrosus*, *Hylastes porculus*, and *Hylastes tenuis*. There was a relationship between populations and treatments. More beetles were found in fertilized plots than unfertilized plots (Table 1). There were also more beetles in the 100, 200 and 300 trees/acre than in the 500 trees/acre (Table 1). Health measurements showed that fertilized plots had higher crown density and lower foliage transparency than did unfertilized plots. Fertilized plots thinned to 100 and 200 trees/acre had a 40 % greater fungal isolation rate than the other treatments. Resin weight and analysis of the alpha- and beta-pinenes (insect attractants) and 4-allyanisole (insect repellant) showed that fertilized plots produced less resin, had higher percentages of alpha- and beta-pinenes, and lower percentages of 4-allyanisole than unfertilized plots (Table 2).

Table 1. Comparison of the mean number of root-feeding bark beetles captured in each treatment.

	BTB	Hpo	Hs	Ht	Pp	Hp
Fertilization						
Fertilizer	37a	167a	1552a	314a	6a	35a
No Fertilizer	36a	123b	1171b	253b	4b	29a
Thinning						
100 tpa	42a	127a	1472a	316a	6a	36a
200 tpa	39a	144a	1527a	314a	5ab	32a
300 tpa	47a	173a	1485a	299a	5ab	28a
400 tpa	18b	137a	960b	207b	3b	32a

*Different letters among treatment for each insect indicates difference was significant at $\alpha = 0.05$

†BTB = *Dendroctonus terebrans*, Hpo = *Hylastes porculus*, Hs = *Hylastes salebrosus*, Ht = *Hylastes tenuis*, Pp = *Pachylobius picivorus*, Hp = *Hylobius pales*

Table 2. Comparison of resin weight (grams) and percent volatiles by treatment.

	Resin (gm)	Alpha-pinene (%)	Beta-pinene (%)	4-AA (%)
Fertilization				
Fertilizer	3.64a	81.76a	41.40a	3.39a
No Fertilizer	6.02b	30.30b	16.71b	6.07b
Thinning				
100 tpa	5.05a	53.05a	24.14a	5.29a
200 tpa	4.99a	55.76a	27.12ab	4.22a
300 tpa	4.55a	57.28a	35.42b	4.91a
400 tpa	4.72	58.04a	29.53ab	4.50b

*Different letters among treatment for each component indicates difference was significant at $\alpha = 0.05$.

These data indicate that fertilization may lower tree defenses and therefore attract more insects especially when coupled with an additional stress such as thinning. The study indicates that fertilization can also be a stressor that makes trees more susceptible to insects as it may lower their defense mechanisms. When a tree is stressed during a thinning and fertilization occurs during this stress condition, the tree may become more vulnerable to attack. More studies need to be conducted to look at this more thoroughly where pre-treatment data can be gathered, there is an additional control (no thin – no fertilizer) added, and an additional treatment addressing the timing between thinning and fertilization.

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