

The LOG

SUMMER 2024

Welcome to the first issue of The Log, a publication dedicated to teaching, research, and extension conducted at the University of Florida's 2,600-acre Austin Cary Forest. In this issue you will meet student and faculty researchers from UF/IFAS School of Forest, Fisheries, and Geomatics Sciences and learn about how they are using the forest to contribute to the future of forest management. Dozens of workshops and events are hosted at Austin Cary Forest annually. From prescribed burning training to youth forestry competitions, the grounds serve as a classroom to generations to come.

INSIDE:



4-H youth from throughout the State of Florida flocked to the woods to measure their forest ecology skills.



Collecting the most sought after seeds. Scarcity of some grass seeds making their value skyrocket.



Two decades of collecting data from 100 feet above the ground leads to proof of best forest management.

LEFT: Dr. Austin Cary among the pines in 1932. He is the author of *A Manual For Northern Woodsmen*.

HARVESTING SEEDS

Gage LaPierre

*Ph.D. Candidate at UF's Forests Systems Lab
Groundcover Enhancement & Restoration
Manager of UF Native Plant Nursery
Co-Chair of Natural Areas Teaching Laboratory*



Austin Cary Forest's seeds used in research, restoration, nursery stock

Q: What is your research area and background and student status?

A: Groundcover (Understory) Restoration & Enhancement. Prior to my doctoral research I studied fire ecology here at UF where I achieved my master's degree at FFGS. I am currently a Ph.D. Candidate in Dr. Michael Andreu's Forest System's lab.

Q: Describe your seed harvesting at Austin Cary Forest. Why is it a good location for seed harvesting and what are you collecting. How often do you seed harvest from there?

A: I collect seeds from Austin Cary Forest for three purposes:

First, is my doctoral research involving groundcover restoration techniques,

Second is restoration of the Natural Area Teaching Laboratory (NATL), and

Third is the production of plant materials at the UF Native Plant Nursery. Seed collecting is mainly done by hand, battery powered vacuum, or gas-powered hand-held flail vac. Much

of the physical seed harvesting is done with the help of UF student interns or volunteers. Seeds are collected during the fall-winter season and stored under dry ambient conditions until used. Austin Cary Forest is an amazing location for seed harvesting chiefly because of superb forest management. This includes historically frequent

species. Austin Cary Forest is also ideal because of its high plant diversity, lack of intensive agricultural land use history, as well as low number of invasive plant populations. We collect seed from the forest primarily twice a year, once in the spring, but primarily in the fall-winter season within units following a spring-summer burn.

Q: When did you first start coming to Austin Cary Forest and what have you learned from your time there?

A: I first started coming to Austin Cary Forest as a field technician working for Dr. Jason Vogel and Dr. Rosvel Bracho around eight years ago. That was following graduating with my bachelor's in environmental science at the University of Florida. Since then, I have learned more than



prescribed fire conducted during the late-spring and summer seasonal periods. This in particular is extremely conducive for the flowering of many of our native forb and graminoid plant

I can even begin to explain! Truly, my time at Austin Cary Forest has been very special. Every year I continue to learn new things and I am very grateful for the resource it provides for me and others.



Q: Are you doing any research projects there currently, if so please describe the study. Or have you already published research that used Austin Cary Forest?

A: I have several research projects associated with Austin Cary Forest. These include:

- *Seed Mixtures:* This project investigates the use of seed mixtures featuring different ratios of native bunchgrasses. The goal of this project is to help provide guidance on the creation of seeding mixtures for restoration of pine savannas. (Finished but not published yet)
- *Flammability Study:* This project seeks to quantify differences in flammability among ten native bunchgrasses collected at Austin Cary Forest. The goal of this project is to better our understanding of the ecological role differing native grasses found throughout the southeast region. (Almost finished)
- *Pond Pine Out-Planting in Restoration:* Pond pine (*Pinus serotina*) is a pyrophytic species of pine found throughout the southeastern coastal plain of the USA. Pond pine is generally found within wet flatwood communities as well along the margins of cypress domes. Compared to other species of pines in Florida remarkably little is known concerning its ecology or use in restoration. This project is investigating efforts to outplant pond pine along different soil types. Post-planting growth rates and mortality are being measured. (On-Going but with some preliminary results)
- *FL Giant Orchid Study:* The terrestrial Florida giant orchid (*Orthochilus ecristatusis*) is found within several types of upland pine savanna. Not much is known concerning its ecology or propagation. The seeds of this species are too small to provide

nutrients for a developing embryo and must form a symbiotic relationship with a fungus which supplies sugars and other growth factors to both seedling and mature plants. The objective of this project is to attempt propagating this species using a technique known as seed baiting. This involves placing the seeds of this species within teabags and burying them at the base of individual plants for up to one year. After which the tea bags are removed from the soil and the seeds placed into media and propagated within nursery containers. (On-Going)

My M.S. research was at ACF and was published. I also published a minor study on propagating silkgrass (seeds from ACF).

Q: What is your ultimate career goal?
A: Work to make groundcover restoration and enhancement more affordable, clear, and efficient.

4-H FOREST ECOLOGY



NATURAL AREAS TRAINING ACADEMY



4-H youth from throughout Florida test their forest ecology skills

By Suzette Cook/Log Editor

More than 70 youth from 16 counties attended the annual Florida 4-H Forest Ecology contest on Saturday, March 30 at University of Florida School of Forest, Fisheries, and Geomatics Science's Austin Cary Forest in Gainesville. The enthusiastic contestants, ages eight to 18, demonstrated impressive knowledge of forest ecology and management.

To prepare for this contest, 4-Hers studied topics including compass and pacing; forest health; forest management; tree measurement; and identifying ecosystems, trees, and wildlife. One junior 4-Her said the best thing about the contest was "getting to learn about nature with my friends."

Thirty volunteers from the University of Florida, the U.S Forest Service and other state agencies, plus local community members made this contest possible.

The competition concluded with awards to the high scorers. Pinellas County Senior Jocelyn Wood took the blue ribbon in individual scoring.

In addition to that ribbon, Wood won a \$500 scholarship to FFGS. "I am so excited because I am going to use that scholarship," she said. "My mind is blown."

Wood said she will attend the University of Florida in the fall and will study forestry at FFGS. Alachua County's William Pruden won first place in the highest individual scoring for the Intermediate group.

And students Lane Taylor, Kylie Goodson, Cora Taylor, Ada Perryman from Marion County won first place in the team effort for seniors.

State 4-H Events Coordinator Courtney Quirie congratulated participants and thanked parents and event planners for their support.

"I can't wait to hear what you all do at nationals," she said to the winners during the awards ceremony.

Contest Coordinator Elise Cassie, who also serves as the Project Learning Tree Coordinator for FFGS, said the event was a success.



"The Florida 4-H Forest Ecology Contest is a unique opportunity for youth to explore the world around them, find life affirming skills, and connect with others who share the same interests," Cassie said. "This is the only program that I know of in the state that offers this and it deserves all of the support we can provide."

The highest scoring senior team is eligible to compete in the National 4-H Forestry Invitational which will be held in July at the Jackson's Mill State 4-H Conference Center in Weston, West Virginia. Florida won the 2023 competition.

Decades-long carbon study delivers forest management techniques

By Suzette Cook/Log Editor

The study "Two decades of carbon dynamics in an actively-managed, naturally-regenerated longleaf/slash pine forest" relied on 21 years of eddy covariance estimates of net ecosystem carbon production, combined with periodic tree inventories, understory biomass and forest floor assessments.

FFGS Assistant Research Scientist Rosvel Bracho joined the study in 2008 and eventually became the principle investigator. The findings determined that "actively managed naturally regenerated pine ecosystems in the region can mitigate carbon dioxide emissions under a broad range of climatic conditions, reduce wildfire risks, all while providing numerous ecosystem services.

Bracho climbed the 100-foot tower once a month to complete sensor maintenance on the CO₂ and water vapor infrared gas analyzer.

His biggest challenge of the study? "Other than securing funding to keep the study going it was interpreting the complex data being gathered from extreme drought to extreme wet conditions."

The data goes into AmeriFlux which is a network of scientist measuring ecosystem carbon, water and energy fluxes across for North and South America. Then, the study was added to the global FluxNet Network.



Tree breeding program aims to enhance loblolly, slash pine quality

By Seth Johnson

With rows of trees stretching for more than 2,000 acres, individual pine trees blur into the next at UF's Austin Cary Forest off Waldo Road in Alachua County. But on roughly 10 acres nestled in the middle, UF School of Forest, Fisheries and Geomatics Sciences Genetics Technician Aaron Smith keeps track of each tree, individual branches on the trees and the specific strobili on each branch.

From January through March, Smith gets face-to-needle with the trees using a mechanical lift. He carefully selects a labeled bottle of yellow pollen, covers a branch with a special-made hood and fertilizes the strobili with the pollen.

The male pollen and female strobili were matched long before Smith climbed the lift as part of the Cooperative Forest Genetics Research Program (CFGRP). The program has worked to enhance the quality and quantity of loblolly and slash pines through genetic breeding since 1953.

The CFGRP now estimates that 99 percent of southern pine seedlings planted in Florida are products of the program.

"If you look at it a naturally grown, what we would call an unimproved loblolly pine, versus a loblolly pine that's coming out of our third cycle of breeding, the straightness of the improved varieties is remarkable," said Smith, a tree improvement technician for the CFGRP.

Compared with corn or carrots, the genetic breeding of pine trees has a short history, with only four or five generations compared to thousands. Smith said America's virgin forests were nearly gone entering the 1950s, prompting changes to the forestry industry.

Smith said foresters began planting pine trees just like farmers grow corn. The change in practice allowed genetic breeding to enter the industry.

The CFGRP started soon after. It's a collective of members that includes UF, three timber companies, two seedling nurseries and two state agencies—the Florida Forest Service and Georgia Forestry Commission.

UF serves as the coordinating member, but Smith said each partner has a role in the breeding process—and each benefit from the results.

Smith said the project tries to enhance different characteristics with each generation. One might focus on straightness, another on wood density followed by an emphasis on disease resistance.

For foresters who sell pine trees, diseases like fusiform rust can damage profits by rendering sections of the tree unusable. Qualities like straightness also benefit end users who pick up 2x4s to build a front porch.

The program also looks at how quickly the plant grows from a seed—a benefit for nurseries.

"Because of the unique nature of breeding pine trees—it's slower than agricultural crops like corn and it's just the scale that it has to take place on—that's the way the co-op benefits," Smith said.



Agricultural crops can have a new generation each year or even more frequently. Plus, these crops can fit more plants within an acre than pine trees.

Smith's work on the lift helps accelerate the process.

He takes pine seedlings that look promising and grafts them into the upper branches of trees at the Austin Cary Forest. The grafting process tricks the branch into thinking its ready for reproduction, causing strobili to form.

Smith then pollinates the strobili and waits for 18 months. Then, the new cones are ready to harvest, plant and wait until it's old enough to check the pine specimen for select characteristics.

Harvesting the 18-month-old specimen happens in September, and the pollinating work gets busy from January through March.

Smith said his life revolves around the strobili during those months, carefully waiting until the optimal time to fertilize. With warm, dry weather, the strobili could be ready earlier—even by Christmas. Cold and wet weather pushes back the timeframe. The strobili open like a blossoming flower, staying at peak fertilization for only a few days. That's when Smith is on the lift and driving up and down the rows.

The fertilizing process, though artificial, tries to mimic the natural process.

Cluster of Atlantic white cedars more south than usual



By Suzette Cook/Log Editor

UF Associate Professor of Forest Systems Dr. Michael Andreu stumbled across a cluster of mature Atlantic white cedar trees at Austin Cary Forest recently and noted that while it's not out of the question that the trees can grow successfully in North Central Florida, they are usually not found in Alachua County.

"Eastern red cedar is a common species here and in places such as Cedar Key," Andreu explained. "But Atlantic white cedar, we are at the southern extent of it. It doesn't grow much further south."

These trees usually dwell in the Florida Panhandle and the Atlantic Coast, he added.

"One of the differences," he said about the Atlantic white cedar, "is the branches. They don't lay in a flat plane." And the Atlantic white cedar is *Chamaecyparis* not *Juniperus*.



Tree Breeding continued from page 7

In nature, Pollen floats through the air until it lands on strobili, and Smith uses an air cyclone to puff the pollen into the bag that surrounds the branch and keeps wild pollens excluded.

A bottle of collected pollen will be used to pair characteristics of the parent with other pines in UF's forest.

The bag, called a pollen-exclusion bag, is specially made to allow air and water to pass through while excluding pollen. Smith keeps the bags on the branches until the strobili hardens and isn't receptive to more pollen.

Pollen forms on pollen cones, found in the lower branches on pine trees while strobili grow in the upper branches. The collected pollen is put in paper bags in a room full of fans to dry.

A large sieve then separates the pollen from other organic tree material. After sitting in a freezer for months, the pollen can then be used in the next batch of grafting and breeding. Smith said the CFGRP has the exact pedigree of each tree, from parents to grandparents and

great-grandparents. "That's basically the crux of our breeding efforts," Smith said.

"We have cones on a known branch and then we take pollen from a known tree, and we apply the pollen to the cones. But we do so within a pollen-exclusion bag, so that we're not getting any contamination of wild unknown pollen."

Smith said the CFGRP wants to encourage quality along with quantity to help end users. He said no one wants to look down the length of a 2x4 and see it veering off to the side.

The program also wants to ensure wood density even with faster harvesting compared with the virgin forests of America's past.

It's all taken into the mix as the CFGRP plans how to breed the next generation of pine trees that span the southeast. And it all comes down to tiny specks of pollen that Smith aims at specific strobili on specific branches of specific trees in UF's Austin Cary Forest.

Story reprinted with expressed permission from MainstreetDailyNews.com

AUSTIN CARY FOREST MANAGEMENT TEAM

Scott Sager, Forester
sasager@ufl.edu

Gary Johns, Operations
purina@ufl.edu

Aaron Smith, Timber Sales
atsmith@ufl.edu

Chris Demers, Research Coordinator
cdemers@ufl.edu

Dr. Michael Andreu, FFGS Properties Chair
mandreu@ufl.edu

Dr. Red Baker, FFGS Director
ttredbaker@ufl.edu

Suzette Cook, FFGS Log Editor
suzettecook@ufl.edu

