AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2020 WORK PLAN

As Proposed to the Southern Forest Nursery Management Cooperative Advisory Committee
October 30 – 31, 2019

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GOAL A: RESEARCH

Objective 1. Identify, test, evaluate, and promote the registration of cost-effective pesticides for use in forest tree nurseries.

Methyl Bromide Substitution

We will collect 2nd year data that examines the efficacy of the structural fumigant sulfuryl fluoride (Vikane®) that was installed as a spring fumigation in collaboration with TriEst Ag Inc and Weyerhaeuser in Magnolia, AR. The data collected will include seedling quality, nematodes, weeds and Trichoderma levels 2-yr post fumigation. Treatment plots were part of the 2019 Southern Forest Nursery Association's annual meeting hosted by Weyerhaeuser. Two-year seedling production with this compound will be compared to the standard MBr. (Nadel/Harges/Payne).

Nursery Weed Control

At the recommendation of SFNMC member nurseries, trials will be designed and installed to investigate weed control methods, including use of herbicides in bareroot and container growing systems. Several trials proposed are continuations or expansions of trials currently in progress.

- **Sequel to post-emergent herbicide screening in bareroot pine:** Replicated screening studies of post-emergent herbicides will be continued in member bareroot pine nurseries, using herbicides with positive tolerance results from previous trials and herbicides not previously tested by the SFNMC. Recommendations for new herbicides to be tested will be made in collaboration with Auburn University College of Agriculture faculty based on targeted weeds and protected crops. (Payne)

- **Sequel to Ronstar®Flo in containers:** An additional replicated study using Ronstar®Flo at sowing will be conducted in several member container nurseries on various container sizes, types of media, capping material, and pine species. (Payne) *The need for and continuation of this study is dependent on results of 2019 trial.*

- **Testing of pre-emergent herbicide (flumioxazin) at sowing in hardwood**

nurseries: Replicated studies with a water-dispersible granular flumioxazin product, Semera WDG, will be installed at sowing in member hardwood nurseries. The purpose of this study is to quantify the tolerance of multiple hardwood species to the product, weed control, and potential carryover effect in the subsequent season. (Payne)

- **Weeds/weed seed source management**: This is a 'by request' service to assist nurseries in identifying sources of weeds/weed seeds and recommending sanitation practices to lessen their impact and production. (Payne)

Fusiform Rust Control

A seedling treatment study will be conducted on loblolly and slash, to test new chemistries in conjunction with the US Forest Service Rust Testing Laboratory in Asheville, NC. Seed will be sown at Auburn into USFS container systems until germination at which time the seedlings will be treated prior to being challenged with basidiospores of fusiform rust (April – Nov 2020) (Nadel/ Enebak)

Based on the results from basidiospore inoculation studies, fungicide treatment chemistries (Compass, Stratigo and propioconizole) will be assessed for a second field season in Georgia. Conifer seed (loblolly and slash) will be sown, with Proline and once germinated, seedlings will be treated every two weeks with compounds to determine rust control. At the end of the growing season, seedlings will be assessed for the incidence of fusiform rust (April - Nov 2020) (Nadel/Enebak)

Nanocellulose/lignin impregnated with insecticides to control pine tip moth

Dependent on 2019 results, using fipronil, we will assess whether to repeat the study on seedlings using imidacloprid. Nanocellulose particles will be created and impregnated with imidacloprid. Particles will be injected onto the root plug of seedlings in a greenhouse. Seedling needles will be sampled. Tissues will be ground and analyzed to determine movement of pesticide through seedling tissues. (Persin/Nadel)

Nematicide trail

We plan to assess the effectiveness of two chemical products used as nematicides (active ingredients to be tested include Fluopyram and Trifloxystrobin). The data collected from the trial will include seedling quality and nematode control (Jan – Nov 2020). (Harges)

Assess the impact of a root stimulator product on pine germination.

To assess the impact of a root stimulator product on seed germination and root development. This

is a manufacturer sponsored project. (Jan – May 2020) (Harges)

Objective 2. Identify and develop economically feasible nursery cultural practices that enhance seedling quality.

Soil stabilizer trial

Multiple soil stabilizer products that have not been tested by the SFNMC (including Dirt Glue and AgriLock Plus) will be included in a product and rate comparison trial. (Nadel/Payne)

Assess the impact of organic soil amendment product on pine regeneration

Manufacturer sponsored project. To assess the impact of a soil amendment microbial inoculum product. Assessing its impact on seedling growth and development. Assess the impact of this product on soil organic matter and foliar nutrition levels. (April – Nov 2020) (Nadel)

Objective 3. Develop methodologies to minimize the environmental impact of nursery cultural practices while maximizing their effectiveness including the development of integrated pest management programs.

Hardening off practice of reducing water availability and its impact on root heath

Root heath and root hydraulic conductivity is of importance to outplanting success. With this study we aim to determine whether the hardening off practice of reducing water availability, prior to the lifting of seedlings, may inadvertently (in warmer winters) increase the vulnerability of seedlings to develop embolisms. As roots play a significant role on whole plant water transport, embolized roots will increase drought vulnerability for outplanted seedlings. Some southern pine species have moderate embolism resistance; however, the majority of studies were undertaken on mature trees. Little is thus known about root vulnerability to cavitation for loblolly seedlings undergoing water stress. As there is no direct comparisons at the seedling stage at a particular site we aim to determine whether there is any potential genetic variation to embolism resistance within loblolly. Nutrient levels of the seedlings will also be monitored overtime. (Nadel/ Samuelson/Via).

Mycorrhizal tolerance to fungicides used to control fusiform rust

Evaluation whether *Pisolithus tinctorius* and *Thelephora terrestris* have adapted resistance to Bayleton (triadimefon), Proline (prothioconizole) and other rust control fungicides (Stratigo and Compass) for these mycorrhizal species using in vitro techniques. (Harges)

Improving Seeding Outplanting Survival

CropCoat is a novel product that covers plant tissue and provides protection from the environment as well as pests and diseases. The purpose of this study would be to determine if an application of this product can increase survival of seedlings outplanted in unfavorable (warm and dry) conditions. (Harges)

Objective 4. Further define the "optimal seedling" to maximize the cost effectiveness of artificial regeneration forestry systems.

Assessing loblolly root development in Ellepot container trays.

Manufacturer sponsored study. The design of their container trays/ system is very different than the more traditional container sets requiring more intensively management irrigation. Seedling quality will be evaluated. The containers have been modified since our previous study and now used in South America and South Africa. (March – Dec 2020) (Nadel)

Impact of genetics on cold hardiness

In collaboration with the Tree Improvement Program at North Carolina State University as well as the Forest Products Development Centre at Auburn University, we want to assess the impact that genetics has on cold acclimation and freeze tolerance. Building on from the collaborative research project undertaken at the Nursery Cooperative in which we showed near infrared spectroscopy to monitor variations in soluble sugars after cold acclimation, we wish to assess whether this model be used for various genetic families of Loblolly pine. If successful, nursery managers could assess the freeze tolerance of seed-lots before outplanting using NIR spectroscopy. (Nadel/Via/Payne)

GOAL B: TECHNOLOGY TRANSFER

Objective 1. Serve as a clearinghouse of information related to nursery production and tree planting.

Methyl Bromide

In collaboration with MBr manufacturers, the Methyl Bromide Industry Panel (MBIP), the Chloropicrin Manufactures Task Force (CMTF) and applicators, the Nursery Cooperative staff will continue to keep abreast of EPA actions and/or possible legislative initiatives that may affect the future availability of soil fumigants. We will continue to inform the membership through the Advisory Committee to keep the membership knowledgeable of these activities

The Nursery Cooperative staff will continue to keep abreast of activities related to the Quarantine pre-shipment (QPS) process. We will inform the membership of any EPA initiatives and continue to work with the AF&PA, the Crop Protection Council, USDA and APHIS to provide input and influence the QPS process if necessary.

The Nursery Cooperative staff will continue to work with the AF&PA, and USDA to inform and influence the EPA deliberations regarding pesticide regulation as it pertains to the soil fumigation re-registration decisions that were released in the 2013. (Nadel/Enebak)

Update of Nursery Label Book

The pesticide spreadsheets on the Nursery Cooperative's website will be updated to include recent additions of herbicide, insecticide and fungicide labels. A technical note will be written that summarizes historical trials of herbicides and fungicides. (Harges)

Re-registration of Nursery Pesticides

The Nursery Cooperative staff will continue to follow the re-registration process for pesticides currently under review under the Food Quality and Protection Act (FQPA) used in seedling production and will provide information to the necessary regulatory agencies (USDA, APHIS, EPA) when necessary. (Enebak/Nadel)

Maintain and Update Nursery Cooperative Web Site

The Nursery Cooperative staff will continue to update the Nursery Cooperative website for use by Nursery Cooperative Members. (Bowersock)

Leveraging Nursery Cooperative Data

The Nursery Cooperative staff will continue to stress the importance of Cooperative membership and when possible, leverage Cooperative information for grant proposals and data cite license for the seedling production survey. (Staff)

Objective 2. Efficiently and regularly transfer the results of cooperative research to the membership.

Contact Meeting

The 2020 Southern Forest Nursery Management Cooperative Contact meeting will be conducted as a ½ -day program in conjunction with the Southern Forest Nursery Association is tentatively scheduled to be held in Charleston, South Carolina. Currently discussing with ArborGen who will

serve as the host during the latter half of July 2020. As usual, the agenda will cover presentations by Nursery Cooperative staff on current research activities and results. Details will be worked out with nursery members with meeting information outlined in the Spring 2020 Newsletter. (Enebak/Bowersock)

Information sheets

"A closer look" is a new outreach document for the SFNM cooperative, this information sheet on pests/ diseases will be produced biannually and will become the centerpiece for each newsletter. (Nadel)

Research Reports (Staff)

We plan on producing Research Reports and Technical Notes in FY20. (Staff)

Newsletters

Newsletter distribution are planned for March and September 2020. Members are encouraged to submit articles and organizational updates. (Staff)

Objective 3. Provide a limited consultancy function to the membership in the area of nursery seedling production and outplanting.

Individual and Organization Contacts

An on-going activity and is handled as individual situations within each organization within the Nursery Cooperative as cases arise during the growing and planting season. (Nadel/Enebak)

Seedling Production Survey

The Nursery Cooperative staff will continue the seedling production survey initiated in FY 03. The same questionnaire will be used to obtain production figures for the 2019 to 2020 planting season. The survey will be sent out in June 2020. (Enebak/Bowersock)

Nursery Customer Meeting Presentations

Over the past several years as schedules and travel permits, Nursery Cooperative personnel have participated customer (internal and external) meetings at nurseries in an effort to encourage and improve customer relations and educate nursery customers on seedling planting and successful

plantation establishment. 30-minute presentations such as "*Why Did My Seedlings Die*?" and "*The Ten Commandments of Seedling Survival*" are presentation the staff have made.

Short Course

With the Nursery Cooperative's short course in Auburn in September 2018 and September 2019, it is expected that we will not have a 2020 Short Course. However, we will send out a request in January 2020 to gauge interest. If enough interest, we will offer another Short Course in September 2020. (Staff)

GOAL C: COOP DEVELOPMENT

Objective 1. Provide for the continual relevancy and efficiency of the Cooperative research and technology transfer programs.

Advisory Committee Meeting

The FY21 Advisory Committee Meeting will be held on October 28-29, 2020. Two, half-day meeting will be planned. (Enebak/Bowersock)

Nursery Cooperative Membership

The Nursery Cooperative staff will continue to recruit new members among those nurseries that will benefit from activities of the Nursery Cooperative. This would include the Florida Division of Forestry, PRT in Atmore and Kentucky State Nursery. (Staff)

Update the Coop Membership and Nursery Directories

An on-going activity with an updated directory distributed annually to each member. (Bowersock)

Objective 2. Increase the visibility and effectiveness of the Cooperative as a source of information on issues related to seedling production and plantation establishment.

Presentations at Meetings

Nursery Cooperative staff will continue to be encouraged to participate as a speaker or attendee in

regional and national meetings related to artificial regeneration. (Staff)

Publications

Nursery Cooperative staff is encouraged to publish research results in scientific journals. (Staff)

Extramural Funding of Nursery Cooperative Projects

Nursery Cooperative staff will continue to be encouraged to locate and generate extramural funding opportunities directly related to artificial regeneration. (Staff)

Interaction with other Research Cooperatives

The Nursery Cooperative staff will make efforts to interact, attend, work with other regional and national forest research Cooperatives to broaden and strengthen research ties that can benefit seedling production. (Staff)