AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2019 WORK PLAN

As Proposed to the Southern Forest Nursery Management Cooperative Advisory Committee
October 31 - November 1, 2018

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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

Cooperative staff has not yet been asked to test any new chemistries or combinations of soil fumigants.

Nursery Weed Control

Information will be gathered and appropriate trials developed and installed to examine methods of weed control by herbicide application, crop seed protection, and weed seed source containment. Several of these herbicide trials are continuations or expansions of trials currently in progress.

- **'New' Postemergent Herbicide Screening in bareroot pine:** Replicated screening studies of postemergent herbicides will be continued in member bareroot pine nurseries. Along with recommendations from AU College of Agriculture faculty, results of recent screening studies will be used to determine inclusion of herbicides in the study. (Payne/Harges)

- '**New' Postemergent Herbicide Screening in containers**: Replicated screening studies of postemergent herbicides successfully tested in bareroot pine will be conducted in member container nurseries to target those weeds occurring later in the growing season. (Payne/Harges)

- **RonstarFlo in containers:** A third-year replicated study using RonstarFlo at sowing will be conducted in several member container nurseries. (Payne/Harges)

- **Postemergent Herbicides in hardwood:** Interest in the use of postemergent granular herbicides in hardwood has been expressed. Trials using granular formulations of oxadiazon and pendimethalin will be installed in member hardwood nurseries. (Payne/Harges)

- **Weed seed source management**: This is a continual process of assisting nurseries in identifying sources of weed seeds as well as recommending practices to lessen their impact and production. (Payne)

Fusiform Rust Control

A seedling treatment study will be done 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 2019) (Nadel/ Enebak)

Based on the results from 2017 and 2018 studies, two identified fungicide treatment chemistries will be assessed infield. Conifer seed (loblolly and slash) will be sown, with once germinated seedlings will be treated infield. Seedlings will be assessed for the incidence of fusiform rust (April - Nov 2018) (Nadel/Enebak)

Nanocellulose/lignin impregnated with insecticides to control pine tip moth

Dependent on 2018 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. Seedlings needles, will be sampled. Tissues will be ground and analyzed to determine movement of pesticide through seedling tissues. (Persin/Nadel).

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

Manufacturer sponsored project. To assess the impact of a root stimulator product on seed germination and root development. (Jan – May 2019)(Nadel/ Harges)

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

Modeling container seedling development

Modeling water hardening off practices and its impact on container seedling development

This will be a continuation of the collaborative project with the Plantation Management Research Cooperative, University of Georgia. We aim to model growth and carbohydrates in container grown pine seedlings over time. The model uses temperature and water availability to predict plant size, and plant carbohydrates levels (Nadel/ Montes).

Soil stabilizer trials

Depending upon the results from the 2018 field season, the new soil stabilizers (H.B Fuller, Tailored Chemical Systems, Soil Tech) may be tested again to confirm soil stabilizer results if shown to be effective. (Nadel/Payne)

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 for these mycorrhizal species using in vitro techniques. (Harges/Enebak).

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

Chilling Hours and Seedling Storability

Manufacturer sponsored study. Determine the impact of ethylene management on increasing seedling storability and its impact on chilling hours through a one molecule inhibitor of ethylene (1-MCP). Increased Ethylene production has been shown to reduce the growth and survival of several agricultural crops. The AgroFresh Inc. 1-MCP product inhibits the production of ethylene (due to the blocking nature of the molecule) and successfully used in fruit production and storage increasing yields and survivability of such crops. There are potential opportunities for the forestry industry to use such a product to increase survivability. This study we aim to determine what impact the 1-MCP molecule will have of ethylene production of seedlings and whether such a product could aid in increasing seedling storability and out planting success. This year we aim to test whether we can apply this compound with the gel over the roots (Nadel/ Enebak/Harges/ Payne)

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 2019) (Nadel)

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 spring 2013. (Nadel/Enebak)

Update of Nursery Label Book

The Nursery Pesticide Label Book on the Nursery Cooperative's website will be updated to include recent additions of herbicide, insecticide and fungicide labels. (Brooks/Enebak)

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 and increase the "searchable" status of the Cooperative's data and reports. (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 2019 Southern Forest Nursery Management Cooperative Contact meeting will be conducted as a 2-day program and is tentatively scheduled to be held in the western area of the southern US. Currently discussing with members in Arkansas to serve as a host during the latter half of July 2019. 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 2019 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 FY19.

Newsletters

Newsletter distribution are planned for March and September 2019. 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 2018 to 2019 planting season. The survey will be sent out in June 2019. (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, we will send out a request in January 2019 to gauge interest. If enough interest, we will offer another Short Course in September 2019. (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 FY20 Advisory Committee Meeting will be held on October 30-31, 2019. A 2, half-day meeting will be planned. (Enebak/Bowersock)

Nursery Cooperative Membership

The Nursery Cooperative staff will make an effort to recruit new members among those nurseries that will benefit from activities of the Nursery Cooperative. (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 in an attempt to broaden and strengthen research ties that can benefit seedling production. (Staff)