AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2021 WORK PLAN

As Proposed at the Southern Forest Nursery Management Cooperative Advisory Committee
November 5, 2020

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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.

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 2021) (Nadel/ Enebak)

Nanocellulose/lignin impregnated with insecticides to control pine tip moth

Dependent on the results obtained from the 2020 sampling. We aim to determine whether this technique can be used with other chemicals. (Persin/Nadel)

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.

- **Post-emergent herbicide timing trial in bareroot pine targeting yellow nutsedge:** Replicated timing trials of 3 post-emergent herbicides not currently labeled for forest-tree nurseries will be conducted in member bareroot pine nurseries. These herbicides list yellow nutsedge on their product labels as being controlled and have been included in previous post-emergent herbicide screenings. This trial will be designed to spray at earlier times in the growing season when yellow nutsedge plants are small (less than 4 inches) in order to increase herbicidal efficacy. Information from participating nurseries on appearance of earliest yellow nutsedge growth will be used to determine the spray schedule. (Payne)

- **Continued testing of pre-emergent herbicide (flumioxazin) at sowing in hardwood nurseries:** A second year of replicated studies using flumioxazin will be installed at the time of sowing in member hardwood nurseries in those species identified in the 2020 trial as being tolerant. Additional hardwood species and SFNMC member nurseries will be included if feasible. (Payne)

- **Ronstar®Flo timing trial in container pine:** A replicated timing trial using Ronstar®Flo in a post-emergent application will be conducted in member container pine nurseries. This herbicide has been successfully tested in pre-emergent applications in SFNMC member nurseries for 3 years. Certain weeds, such as oxalis, are presenting larger populations more efficiently controlled by herbicide than by hand-weeding if a safe, effective herbicide can be identified. (Payne)

- **Modified Sowing Operations:** A study comparing current order of operations during sowing to a modified version applying herbicides to beds days prior to sowing and barking will be installed in a member bareroot nursery. In those nurseries where labor and equipment is limited, the ability to expand the number of days for sowing operations will alleviate pressures of completing all sowing operations within a narrower period of time. (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)

Nematicide trail

This trial with Broadform™ (fluopyram + trifloxystrobin) will be continued in 2021 if nematode control and seedling tolerance is satisfactory as determined from results of the 2020 study. Adjustments to the 2020 spraying regime (rates, timings, number of sprays) may be made in order to focus applications on those shown to be most effective in 2020. (Payne/Stokes)

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

Seedling Counting/Measuring

Researchers at AU's Biosystem Engineering Department will continue to examine and develop a system to count seedlings for inventory using new technologies. Nursery Cooperative Funds will not be used on this project. (Bao/McDonald/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. Continue with ongoing study, focusing on model development and carbohydrate analyses and its implications on potential outplanting growth and survival. (Nadel/ Stokes/Via).

Cold storage effects on seedling physiological quality and outplanting vigor

The physiological quality of seedlings can be affected by seedling cold storage, which may lead to a reduction in outplanting vigor and success. Seedlings' stored carbohydrates and water status can negatively impact its storability. Warmer winters may result in increased maintenance respiration before lifting occurs, resulting in a partial depletion of stored carbohydrates prior to seedlings placed in cold storage. The outplanting of seedlings with depleted carbohydrate levels may result in delayed growth once outplanted. This study aims to determine the effects cold storage (1 – 4 weeks) on seedling carbohydrate reserves and water status and in turn on outplanting growth (Stokes / Nadel)

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/Payn - NCSU)

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)

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/Payne)

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 2021 Southern Forest Nursery Management Cooperative Contact meeting will be conducted as a 2-day program in July 2021. 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 2021 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 FY21. (Staff)

Newsletters

Newsletter distribution are planned for March and September 2021. 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 2020 to 2021 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

We will send out a request in January 2021 to gauge interest. If enough interest, we will offer another Short Course in September 2021. (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 FY22 Advisory Committee Meeting will be held on October 27-28, 2021. 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. There is also discussion with non-nursery production members to include an Affiliate status (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 results outlined in annual Research Reports and Technical notes in scientific journals after a period of 2-3 years have elapsed. (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)

International Nursery Research Collaboration

Working with joint nursery research in other regions of the world, a 5-8 day trip that allows interaction of Nursery Cooperative Members with other nursery production systems in South Africa will be identified and planned for Summer 2021.