Southern Forest
Nursery Management Cooperative

FY 2022
WORK PLAN

As presented to the Advisory Committee of the Southern Forest Nursery Management Cooperative

November 3-4, 2021

AUBURN UNIVERSITY

SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2022 WORK PLAN

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 to test new chemistries on loblolly and slash pine will be conducted in conjunction with the US Forest Service Rust Testing Laboratory in Asheville, NC. These are Revytek® (mefentrifluconazole/fluxapyroxad/pyraclostrobin), Ascernity® (benzovindiflupyr / difenoconazole), and Miravis Duo® (pydiflumetofen /difenoconazole), all of which the active ingredients have preventative, systemic, and curative properties that provide a number of different modes of disease control. 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 2022) (Abraham/Stokes)

Nanocellulose/Lignin Impregnated with Insecticides to Control Pine Tip Moth

Dependent on the results obtained from the 2021 sampling using imidacloprid and prothioconazole, we aim to determine how long the ai remains within the plant tissue and whether this technique can be used with other chemicals. (Stokes/Peresin/Newell)

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.

- **Large-scale post-emergent herbicide trial targeting yellow nutsedge in bareroot pine:** Replicated trials of Vexis® (pyrimisulfan) post-emergent herbicide will be conducted in multiple bareroot pine nurseries. This herbicide specifically targets nutsedge but is not currently labeled for conifer nurseries. Rates of ½X, 1X, 2X and 4X (if required by manufacturer) will be applied in trials at several member nurseries in multiple pine species. The timing will be consistent on all installations (between 8 – 9 weeks post-sowing). Data collected from these trials may be used by the manufacturer to request Section 24(c) Special Local Needs labels in the states where SFNMC member nurseries are located. (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)

Nematicide Trials

This trial with Broadform™ (fluopyram + trifloxystrobin) will be continued in 2022 at the Bullard Texas nursery if nematode control and seedling tolerance is satisfactory as determined from results of the 2021 study. Adjustments to the 2021 spraying regime (rates, timings, number of sprays) may be made in order to focus applications on those shown to be most effective in 2021. (Payne/Newell)

A second trial using Reklemel™ active (fluazaindolizine) which is a non-fumigant, chemical nematicide discovered and developed by Corteva Agriscience. Reklemel™ is the first sulfonamide nematicide, a chemical group different from other commercial nematicides. Its mode of action appears different from all other currently available nematicides, including the traditional fumigants, organophosphates, and carbamates and the newer active ingredients, such as fluopyram, fluensulfone, and tioxazafen. Reklemel™ has excellent activity on root-knot nematodes and many other important plant-parasitic nematode species. It has a favorable environmental profile and is biologically compatible with beneficial insects, including pollinators and a wide range of beneficial soil organisms. (Newell/Payne)

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

Root Development Biostimulants

MitoGrow produces Aqua 3-IA, a biostimulant product that stimulates root development and growth. This product encourages plant growth and can increase root mass by 30 percent in most plant species and up to 50 percent in hardwood plants and trees. (Newell)

Seedling Counting/Measuring

Researchers in AU's Biosystems 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/Stokes)

Seed Disinfectant Systems

Light at different wavelengths on the electromagnetic spectrum can be used as broad-spectrum antimicrobials. Specifically, Ultraviolet Light (UVC) and Near-Infrared (NIR) have been used in sterilization, surgery, seed in transport, food systems, etc. If this technology can be transferred to seed treatment without any negative effects on germination, it could be beneficial for nurseries (Newell)

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 Health

Following our trial reported in Research Report 21-04 that suggest that loblolly pine does not have a mechanism to refill embolized xylem conduits, we propose to further investigate the impacts of nursery drought hardening practices on the physiology and outplanting success of loblolly pine. We intend to examine multiple drought hardening routines with quantitative measures to determine an optimal strategy to achieve proper drought condition seedlings (Stokes/Newell).

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

Impact of Genetics on Cold Hardiness and NIR spectroscopy

In collaboration with the Tree Improvement Program at North Carolina State University as well as the Forest Products Development Center at Auburn University, we want to assess the impact that genetics has on cold acclimation and freeze tolerance. Building on 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 can be used for various genetic families of loblolly pine. If successful, nursery managers could use NIR Spectroscopy to assess the freeze tolerance of seed lots before outplanting. (Stokes/Via/Heine - NCSU)

Impacts of Genetics on Freeze Damage as Measured by Chlorophyll Fluorescence

In collaboration with the Tree Improvement Program at North Carolina State University, we want to assess the ability of using chlorophyll fluorescence to ascertain the degree of immediate damage caused by sub-freezing temperatures and also the ability to predict future damage and survival. This will be accomplished by challenging 3 genotypes of known freeze tolerance with an experimental freeze mimicking natural freeze events that occur in the region and examining the changes in chlorophyll reflectance. (Stokes/Newell/Heine - 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. (Enebak/Newell/Payne)

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/Newell/Payne/Stokes)

Labeling of Nursery Pesticides

Using information gained from the herbicide, fungicide, insecticide and nematicide trials, Nursery Cooperative staff will work with registrants, EPA, USDA and State Plant Protection agencies to obtain labels, special use (24-C), or full label status for member states. (Payne/Newell/Enebak)

Maintain and Update Nursery Cooperative Website

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 licensing for the seedling production survey. (Staff)

Update Forest Seedling Crop Profile

Working with the Southern IPM Center, we will begin the process of transferring the Forest Seedling Nursery Practices in the Southern US – Bareroot and Container information into the Crop Profile database. Data will also come from the USDA Forest Service Handbook 680, 2012. Conduct a workshop with growers, stakeholders, and research scientists to develop a plan to locate any missing "data" or "pesticide usage" into the Crop Profile. (Newell)

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

Contact Meeting

The 2022 Southern Forest Nursery Management Cooperative Contact meeting will be conducted as a 1/2-day program in July 2022 in conjunction with the Southern Forest Nursery Association, scheduled to be held in Charleston, South Carolina. As usual, the agenda will cover presentations by Nursery Cooperative staff on current research activities and results. Details will be planned with nursery members, with meeting information outlined in the Spring 2022 Newsletter. (Enebak/Bowersock)

Information Sheets

"A Closer Look" is a new outreach document for the SFNMC. This information sheet on pests/diseases will be produced biannually and be the centerpiece for each newsletter. (Enebak/Staff)

Research Reports

We plan on producing Research Reports and Technical Notes in FY22 that document all research conducted by the Nursery Cooperative; these will be distributed to each member nursery. (Staff)

Newsletters

Newsletter distributions are planned for March and September 2022. 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. (Enebak/Newell/Payne/Stokes)

Seedling Production Survey

The Nursery Cooperative staff will continue the seedling production survey initiated in FY03. The same questionnaire will be used to obtain production figures for the 2021to 2022 planting season. The survey will be sent out in June 2022. (Enebak/Newell/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. (Staff)

Short Course

Restrictions on travel for participants and speakers continued to get in the way of successfully conducting this informative and important workshop for new nursery personnel. We will send out a request in January 2022 to gauge interest and availability. If enough interest is shown, and travel is not restricted, we will offer another Short Course in September 2022. (Staff)

GOAL C: COOPERATIVE DEVELOPMENT

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

Advisory Committee Meeting

The FY23 Advisory Committee Meeting will be held on November 2-3, 2022. A 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, AL, and Kentucky State Nursery. There is also discussion with non-nursery production members to include an Associate status. (Staff)

Update the Cooperative 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 2022. (Nadel)