AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2016 WORK PLAN

As approved to the Southern Forest Nursery Management Cooperative Advisory Committee
November 11 - 12, 2015

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2016 WORK PLAN

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

No new studies have been recommended. A couple of watch trials were installed at member nurseries that used higher rates of MBr and propylene oxide as a soil fumigant. If needed, Nursery Cooperative staff can assist member nurseries in data analysis.

Herbicide Trials

Herbicide trials will be developed and installed to examine the effects of herbicides on specific weeds and on seedling quality. Several of these are further developments of herbicide studies installed in 2015.

- In response to insufficient weed pressure in 2015 and to acquire additional seedling tolerance information, a container trial will be repeated to test the effectiveness of Pendulum® AquaCap™ on black willow and other weed control, and to test pine tolerance to applications of PAC in container media. Applications will be made weekly during the sowing period to coincide with willow seed dispersal. (Payne/Enebak)

- Two outplanting studies will be installed at Westervelt (AL) and the IFCO nursery/orchard (LA) using container loblolly seedlings: one study will include seedlings treated with Marengo® during the 2015 growing season and the second will include seedlings treated with Pendulum® AquaCap™ during the 2015 growing season. Both studies will be used to compare survivability to non-treated seedlings. The nursery /orchard outplanting site in Louisiana will be part of the Southern Forest Nursery Association meeting nursery tour. (Payne/Enebak)

- A study testing multiple post-emergent herbicides for the control of broadleaf weeds, grasses and sedges will be installed at member nurseries of various soil types. These herbicides have been identified by AU Department of Crop, Soil and Environmental Sciences faculty as potential control agents for member nurseries' identified weed problems but have not yet been tested by the Nursery Cooperative. Possible herbicides include penoxsulam, florasulam and trifloxysulfuron. Pine seedling tolerance and herbicidal effectiveness will be measured. (Payne/Enebak)

- Morning glory and other broadleaf weeds in hardwood nurseries continue to be a problem. Trials testing the ability of herbicides to control weeds with directed spray applications in hardwoods will be installed as equipment is available. (Payne/Enebak)

Fusiform Rust Control

A seed treatment study on loblolly will be done using various rates of Proline® in conjunction with the US Forest Service Rust Testing Laboratory in Asheville, NC. Current label rates for Proline® as a seed treatment on conifer seed were based on the use of tridimefon activity. Label rates for others agronomic seeds are 10-100 x less ai per unit of treated seed. The ability to identify the lowest effective rate for Proline® use on conifer seed will decrease pesticide usage. Conifer seed (longleaf, loblolly and slash) will be treated in Auburn and then sown into USFS container systems until germination at which time the seedlings will be challenged with basidiospores of fusiform rust. (April - Nov 2016) (Starkey/ Enebak)

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

Development of a rapid screening test for the presence of *Fusarium circinatum*

Pitch canker caused by *Fusarium circinatum* is an economically important disease occurring on 47 pine species worldwide. We continue testing this new method on conifer seed and seedlings for the presence of the pitch canker fungus and aim to have this new technology adopted and approved by the International Seed Testing Association (ISTA) as a seed screening method that can then be enforced as an alternative to the current blotter paper method used by seed certification companies, disease diagnostic laboratories and plant inspection agencies. SFWS staff will focus on equipment grants that would allow the purchase of a qPCR such that the system could be used to quantify seed infestation. (Nadel/Enebak)

Using Near Infrared (NIR) to Detect Freeze Injury in Loblolly Pine

Near-infrared Spectroscopy (NIR) was originally developed for use in the pharmaceutical industry and is now used in agriculture, and chemical manufacturing. Recently this technique has found a use in identifying different species of Eucalyptus. Initial testing in both bareroot and container loblolly pine that represents a base line for freeze tolerance (e.g. 7-56, Atlantic Coast, Marion County) will be done with a laboratory NIR machine to develop a baseline for non-injured tissue. Two years of funding has been secured from SFWS to bring on a PhD student, who has been identified and is starting on the project in June 2016. Seedlings will then be subjected to various levels of exposure to freezing temperatures to determine if freeze injury can be detected. If successful, we will try to obtain a portable NIR instrument which has been successfully used in forestry. (June 16 – Dec 2017) (Starkey/Enebak/Via)

Controlled Release Fertilizers in Container Seedlings & Nutrient Status

This study will be repeated for a second year using the same protocol as this last year.
The use of long-term controlled release fertilizers (CRF) (> 14-18 months) will be examined in the production and nutrient status of container seedlings over time. Examples of CRF would be #2 Polyon 16-5-11 and Multicote coated urea. Container sets at IFCO will be seeded with different numbers of prills and seedling nutrient status analyzed at the end of the season. Other participating nurseries will be asked to incorporate a sample of both fertilizers in a small portion of their media by hand. Nutrient status will be measured on seedlings treated with various fertilizers and examined for foliar nutrients after outplanting. Nurseries interested in participating in the experiment include IFCO, River Bend, North Carolina Forestry Commission and Westervelt. (Starkey/Enebak).

Monitoring the hardening off of seedlings

The hardening off of seedlings typically begins with the reduction of irrigation and fertilizer. However, occasionally seedlots that have not reached their target standards are “pushed” into the early fall. If these seedlings have not been properly hardened before shipping, they may suffer freeze injury in the nursery or field that can effect establishment and growth. Monitoring the dry weight fraction of the terminal leader is a method used in colder climates before seedlings are subjected to freezing temperatures. The results have been variable. To our knowledge, this method has not studied for southern species. The dry weight fraction of the terminal leader will be monitored every two weeks beginning in early October until January and correlated with temperatures and foliar analysis. (Starkey/Enebak)

The effect of a new formulation of Thiram on loblolly pine germination

Last April, a nursery that treats their seed with Thiram reported a significant reduction in germination on their loblolly pine with a new Thiram formulation. This January we will do a seed treatment and germination study in the greenhouse comparing the two formulations of Thiram. (Starkey/Enebak)

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.

The use of drones: Unmanned Aerial Vehicles (UVAs) in seedling production

Working with the Department of Bioscience in the College of Agriculture, 2 nurseries will be flown over the growing season and the data analyzed to examine the effects of nursery practices on seedling productivity. (McDonald/Starkey/Enebak)

The availability of prills for PTM use in container seedling production.

Nursery Cooperative staff will determine the feasibility of fiprinol in prills as a delivery method for insect control in container seedlings. (Brooks/Starkey/Enebak)

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

The effect of central terminal leader integrity on root growth following outplanting

In a good year, seedlings that have been outplanted will begin new root growth within six weeks of outplanting. Last year a number of outplanted seedlings were examined from stands having poor seedling performance. There was a consistent correlation in a lack of root growth for those seedlings that had a visibly dead central terminal leader. This study will examine the root growth associated with outplanted seedlings with a central terminal leader and with a central terminal leader that has been killed. This study will be partially done in Plexiglas boxes in the greenhouse and also in the stress facility, in addition to seedlings planted in the Trophotron. (Starkey/Enebak)

Comparison of loblolly root development in two types of Ellepot container trays.

This is a manufacturer sponsored study. The design of these container trays/systems are very different than more traditional container sets requiring more intensively management irrigation. Seedling quality will be evaluated. These containers are being used in South America. The first phase of this study last year was to compare seedling quality and RGP. This next year we will place seedlings in out Plexiglas boxes and examine root morphology. (Starkey)

Chilling Hours and Seedling Storability.

A meta-data analysis (statistical analysis of data across multiple studies) will be attempted to determine if there is a link to the number of chilling hours seedlings are exposed to and their ability to survive storage after outplanting. (Enebak/Loewenstein).

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 spring 2013. (Starkey/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)

Revision of Ag Handbook 473, Hardwood Nursery Guide (Hardwood Manual)

In collaboration with the US Forest Service and with input from Nursery Cooperative membership, Dr. McNabb and Nursery Cooperative staff will make one last attempt to identify authors for the missing chapters of the Hardwood Manual. If they cannot be completed, we will post the completed chapters on the Nursery Cooperative Web Site for member access. (McNabb/Enebak/Bowersock)

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, etc) when necessary. (Enebak/Starkey)

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 Nursery Cooperative Contact meeting will be conducted as a 1/2 day program will be held in conjunction with the Southern Forest Nurserymen's Association Meeting in Louisiana, with IFCO hosting the nursery tour in July 18-21, 2016. The agenda will cover presentations by Nursery Cooperative staff on current research activities and results. Details will be worked out with George Hernandez and Jim Tule (IFCO) with meeting information outlined in the Spring 2016 Newsletter. (Enebak/Bowersock)

Research Reports (Staff)

We plan on producing Research Reports and Technical Notes in FY16.

Newsletters

Newsletter distribution will be planned for March and September 2016. 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. (Starkey/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 2015 to 2016 planting season. The survey will be sent out in June 2016. (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 2015, we will hold off for a year or two and revisit the course again in January 2017. The Short course would be in September 2017. (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 FY16 Advisory Committee Meeting will be held on November 10-11, 2016. A 2, half-day meeting will be planned. If there are any meetings that conflict with this time frame, let us know and we can try and accommodate Advisory Members. (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.