AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2019 ACCOMPLISHMENTS

As Presented 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

A study that examines the efficacy of the structural fumigant sulfuryl fluoride (Vikane®) will be installed either as a fall or spring fumigation in collaboration with TriEst Ag Inc and Weyerhaeuser. The data collected will include seedling quality, nematodes, weeds and Trichoderma levels prior to and 1-yr post fumigation. Treatment plots will be part of the 2019 Southern Forest Nursery Association's annual meeting to be hosted by Weyerhaeuser (Nadel/Harges/Payne).

- ***Accomplishment: Trial was successfully installed in Spring 2019 with pre – and post-Trichoderma and nematode levels measured. Seedling counts undertaken. Trial used as a demonstration site for the Nursery Coop contact meeting in July 2019. Final seedling characteristics will be collected in Nov/ Dec 2019.***

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' Post-emergent Herbicide Screening in bareroot pine:** Replicated screening studies of post-emergent 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)

    - ***Accomplishment: This trial was installed in early July at four-member nurseries. Four installations were made in loblolly pine and one in slash pine,***

utilizing a total of 2,240 feet of bed space. Ten herbicides are being tested, with 8 being retested from last year and 2 new herbicides added. Visual inspections in August and September show that at least 2 of the herbicides cause injury to pines in nursery beds. Field collections and lab measurements will be made in November – January, with a research report to follow in 2020. For 2 of the herbicides, 2019 is the fourth year of testing; if 2019 results are positive, we will pursue labeling with the manufacturers.

- '**New' Post-emergent Herbicide Screening in containers**: Replicated screening studies of post-emergent 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)

  - ***Accomplishment: The decision was made to postpone this study until container growers identify sufficient need for late-season weed control that would warrant potential injury to seedlings during herbicide testing.***

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

  - ***Accomplishment: This study was installed in March, April and May 2019 in two member container nurseries. A total of 4 installations were made in loblolly pine, 2 in longleaf pine and 1 each in shortleaf and slash pine. Sample sizes (number of trays included) were increased over previous years' studies in order to obtain more information on the herbicidal effect on container pine growth. Seedling counts and collections will be made in November and December, with lab measurements completed in a timely manner. A research report will follow in 2020. If results are positive, a supplemental label will not be required for Ronstar®Flo as it is currently labeled for use in conifer nurseries.***

- **Post-emergent Herbicides in hardwood:** Interest in the use of post-emergent granular herbicides in hardwood has been expressed. Trials using granular formulations of oxadiazon, Ronstar®Flo and pendimethalin will be installed in member hardwood nurseries. (Payne/Harges)

  - ***Accomplishment: Accomplishment: This study was postponed due to the lack of interest in and availability of using calibrated granular spreaders. An alternative study testing a water dispersible granular product for control of weeds in hardwoods is under consideration as a 2020 trial.***

- **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)

  - ***Accomplishment: This process continues as visits are made to individual***

nurseries. Recommendations of practices to lessen weed/weed seed introduction and distribution in nurseries have included sanitation of equipment and trucks between fields, identifying cleaner sources of mulch or bark brought in from outside sources, and increasing weed control measures along riser lines, bed ends, fence lines, roads and ditches. Pulling existing weeds before they go to seed and disposing of weeds by burial or burning has also been suggested.

- ***Accomplishment: TapOut® as a Postemergent Herbicide in Containers: This trial was added in June 2019 as the need arose in a member container nursery for control of various grasses in containers after seedling germination. To determine the effect of this clethodim product on seedlings grown in media, two installations were made, one in 7-week-old loblolly pine and another in 4-week-old shortleaf pine, using multiple rates of TapOut®. Seedling counts and collections will be made in November and December, with lab measurements completed in a timely manner. A research report will follow in 2020. If results are positive, a supplemental label will not be required for TapOut® as it is currently labeled for use in conifer nurseries. (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)

- ***Accomplishments: Loblolly and Slash seedlings were treated with two potential new chemistries (propiconazole and Azoxystrobin + Benzovindiflupyr) with standard Proline and water checks to determine the efficacy of the new chemistries to control fusiform rust. 6 weeks post sowing seedlings were treated and sent to the USFS Rust Testing Laboratory where they were challenged with 30 000 basidiospores of Cronartium quercuum f.sp. fusiforme. Final amount of infection will be recorded in November and determined by treatment.***

Based on the results from 2017 and 2018 studies, two identified fungicide treatment chemistries (Compass, Stratigo and propioconizole) will be assessed in field settings. Conifer seed (loblolly and slash) will be sown, with bayelton 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 2018) (Nadel/Enebak)

- ***Accomplishment: Loblolly and Slash seedlings were treated with two chemistries (Compass and Stategо) with standards Proline and control checks to determine the efficacy of the new chemistries to control fusiform rust. 1 month post sowing seedlings and at two weeks intervals until the end of July seedlings were sprayed. Seedlings were challenged by natural population of basidiospores of Cronartium quercuum f.sp.***

fusiforme that occur within the nursery. Final amounts of infection will be recorded in November and determined by treatment.

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).

- ***Accomplishment: The new method for sampling and monitoring residuals in different part of the seedling up to 12 months following application was developed. We have filed an invention disclosure and provisional patent for this system.***

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)

- ***Accomplishment: Trial was successfully conducted in the spring and early summer of 2019. The product was evaluated for effects on germination, survival, and root elongation. Results of the treatment on seedling root growth was not significant have been included in Research Report 2019-07.***

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).

- ***Accomplishment: We monitored the growth of the seedlings since sowing. Issues with germination and seedling growth resulted in the halting of this study. We have no further plans for this trial.***

Soil stabilizer trials

Soil stabilizers (H.B Fuller, Tailored Chemical Systems) the liquid form will be compared to the powered form of Soil Tech to determine effectiveness of the powered mixture over the prepared liquid mixture. (Nadel/Payne)

- ***Accomplishment: This study was cancelled due to higher market costs of available powdered soil stabilizer over liquids tested in 2018. Additional liquid soil stabilizer products are under consideration for testing in 2020.***

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).

- ***Accomplishment: Project ongoing. Seedlings were planted in the Nursery Coop water stress facility. Individual seedlings were watered on a weekly basis to either saturation, historical rainfall amounts or to 2016 drought condition. On midday water potentials were measured together with shoot and root weights over time. In May seedlings were all watered to saturation and we continue to monitor the growth of remaining seedling in the stress facility to see the impact that xylem cavitation has on seedling growth.***

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/Enebak).

- ***Accomplishment: This trial was initiated and is underway with several fungal isolates have cultured and are being maintained in the laboratory. Additional fungal isolates are being obtained and cultured as well. The study will move on towards evaluating fungal response to rust control fungicides as soon as enough isolates are in culture.***

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)

- ***Accomplishment: Following the results, from research undertaken by the Nursery Coop, of the first two years of the study in which LandSpring improved tree seedling survival. EPA approved the product label to include conifer seedlings. This year we have been testing the effectiveness of the product when applied as a gel treatment to the roots, with results expected as the end of the growing season.***

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)

- ***Accomplishment: Trial ongoing. Seedling quality measurements to be undertaken at the end of the growing season.***

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)

- ***Accomplishment: Nursery Cooperative staff participated in 1 conference call with the Chloropicrin Manufactures' Task Force on the reregistration of Chloropicrin. Nursery Cooperative staff responded with data usage collected from the annual soil fumigation surveys.***

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. (Harges/Enebak)

- ***Accomplishment: The collection and listing of herbicides, insecticides and fungicide labels continues. Labels for herbicides, Insecticides and Fungicides were linked to an Excel Spreadsheet that is available on the Nursery Cooperative Web Page.***

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)

- ***Accomplishment: One request was received from USDA / APHIS in February 2019, concerning the continuation of state labels containing chloropicrin. Using the soil fumigation survey data supplied by members to Auburn, a list of all compounds used in the process of soil fumigation was forwarded to EPA for continued support of those labels.***

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)

- ***Accomplishment: The Southern Forest Nursery Management Cooperative web site was updated to include all outreach efforts (Research Reports, Contact Meetings, Short Course) to members of the Cooperative.***

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)

- ***Accomplishments: The Nursery Cooperative had a third year added to the 5-yr agreement to share seedling production data under a Cite License. For an annual fee of $10,000, seedling production data will be given to USFS Washington Office for them to use in their planning and reporting programs. Funds are used towards Elizabeth Bowersock's salary to compensate for her time.***

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)

- ***Accomplishment: The 2019 Nursery Cooperative Contact meeting was held on July***

16-18, 2019 as a 2.5 day program held in Shreveport, Louisiana. There were 31 members who attended the meeting and special thanks to Bobby Catrett and all his staff at the Weyerhaeuser's Nursery in Magnolia, Arkansas who hosted the nursery tour and sponsored a great lunch for everyone.

Information Sheets

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

- ***Accomplishment: We have continued to produce information sheets for each of the newsletters. Pests and Diseases highlighted to date include: Rhizoctonia crown rot and needle blight; Tarnish plant bugs- Lygus spp.; Tip blight or tip dieback on southern pines.***

Research Reports (Staff)

We plan on producing Research Reports and Technical Notes in FY19. (Staff)

- ***Accomplishment: Nursery Cooperative staff produced 7 Research Reports, 2 Technical Notes, and 3 Management Alerts that covered the following topics.***

    - ***RR 2019-01. Results from the 2018 Fusiform Rust Trial Testing the Efficacy of Potential New Synthetic and Biological Fungicides. Nadel.***

    - ***RR 2019-02. Copper Trials on Loblolly Pine Seedbeds. Payne, Nadel and Enebak.***

    - ***RR 2019-03. Micronutrient use on Loblolly Pine Seedbeds. Payne, Nadel and Enebak.***

    - ***RR 2019-04. Postemergence Herbicide Screening Trials on Loblolly and Slash Pine Seedbeds II. Payne, Nadel and Enebak***

    - ***RR 2019-05. Ronstar®Flo (oxadiazon) on Loblolly and Longleaf Pine in a Container-grown Nursery. Payne, Nadel and Enebak.***

    - ***RR 2019-06. Soil Stabilizers on Loblolly Pine Seedbeds. Payne, Nadel and Enebak.***

    - ***RR 2019-07. Essential Plus 1-0-1 Greenhouse Trials. Harges, Nadel and Enebak.***

- ***TN 2019-01. Seedling Survival is Impacted by Practices in Outplanting. Nadel and Enebak.***

- ***TN 2019-02. Forest-Tree Seedling Production in the Southern United States for the 2017-2018 Planting Season. Enebak.***

- ***MA 2019-01. Be Alert of Upcoming Freeze Injury Conditions – 1/2019.***

- ***MA 2019-02. Be Alert of Upcoming Freeze Injury Conditions – 3/2019.***

- ***MA 2019-03. Widespread seedling survival issues observed throughout the southern United States; March – June 2019.***

Newsletters

Newsletter distribution are planned for March and September 2019. Members are encouraged to submit articles and organizational updates. (Staff)

- ***Accomplishment: Two newsletters were produced and mailed via the US Post Office and emailed to 102 contacts within the Nursery Cooperative membership in March and September 2019.***

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)

- ***Accomplishment: Staff participated in the following contacts***

	Payne	Enebak	Nadel	Harges
Phone calls	**21**	**15**	**35**	**29**
Letters	**0**	**2**	**0**	**0**
Emails	**53**	**32**	**54**	**59**
Site Visits	**43**	**3**	**4**	**16**
Diagnosis	**6**	**14**	**36**	**0**

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)

- ***Accomplishment: A mailing list that included 56 nurseries was sent in May 2019 throughout the southern US to gauge seedling production for the 2018-2019 planting season. Data was compiled and put into Technical Note 19-01 that will be distributed to all participating nurseries.***

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.

- ***Accomplishment: No invitations were requested for FY 19.***

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)

- ***Accomplishment: The Nursery Short course was conducted in Auburn the week of September 9th, 2019. The 3-day event, starting noon on September 10 and ending at noon on September 13th included 18 attendees from 10 states and 7 nursery members. Continuing Forestry Education Credits (CFE) 10 hrs Category 1 and 2, and Pesticide Points 32-42 credits in 3-5 categories were earned for those who needed them.***

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)

- ***Accomplishment: Nursery Cooperative Advisory Meeting will be conducted in Auburn on October 30 -31, 2019. FY20 Workplan, FY19 Accomplishments and FY19-20 Budget will be shared with membership.***

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)

- ***Accomplishment: With the purchase of the White City Nursery by IFCO, we have added another nursery site for cooperative research. In addition, Meeks Farm and Nursery joined for FY20 bringing membership to 16 members. Steve Meeks will serve as the Advisory Member. We continue to have conversations with PRT that operates the container nursery in Atmore, AL and the Florida Division of Forestry.***

Update the Coop Membership and Nursery Directories

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

- ***Accomplishment: Nursery Cooperative Membership Directory was updated and sent to Cooperative Members in November 2018 and again in June 2019.***

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)

- ***Accomplishment: Two presentations were made to external collaborators in 2019.***

    - ***Seedling storage and survival. (Nadel). Joint annual meeting: Northeast and Southern Forest and Conservation Nursery Associations. Atlantic City, New Jersey, 22 – 25 July 2019***

    - ***Lifting dates, chilling hours and storage duration on root growth potential (RGP), growth and survival. (Nadel). Joint meeting of the Forest Nursery Association of British Columbia and the Western Forestry Conservation Nursery Association, Sidney, British Columbia Canada (30 September - 2 October 2019).***

Publications

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

- ***Accomplishment: Nursery Cooperative Staff were involved with 6 peer-reviewed publications on forest health and seedling quality topics.***

    - ***Devkota P., Mensah J.K., Nadel R.L., Matusick G. and Eckhardt L.G. (2019). Pinus taeda L. response to differential inoculum density of Leptographium terebrantis colonized toothpicks. Forest pathology 49 (1), e 12474***

    - ***Dlamini L.S., Little K.M., Sivparsad B. and Nadel R.L. (2019). Quantifying the impact of foliar insects on two Eucalyptus hybrids in Zululnad, northern kwaZulu-Natal, South Africa. South African Journal of Plant and Soil 36(2) pg. 129 – 135.***

    - ***Devkota P., Nadel R.L. and Eckhardt L.G. (2018). Intra species variation of mature Pinus taeda in response to root- infecting ophiostomatoid fungi. Forest Pathology 48 (3) pg. 1 – 9***

    - ***South D.B, Nadel R.L., Enebak S.A. and Bickerstaff (2018). The nutrition of loblolly pine seedlings exhibit both positive (soil) and negative (foliage0 correlation with seedling mass. Tree planters notes 16(2) pg. 5 – 17***

- ***Mensah J., Sayer M.A., Nadel R.L., Matusick G., Fan Z. and Eckhardt L.G. (2018). Physiological response of naturally regenerated Pinus taeda L. saplings to four levels of stem inoculation with Leptographium terebrantis. Phytopathology 108 (10)***

- ***Mensah J., Sayer M.A., Nadel R.L., Fan Z., Matusick G. and Eckhardt L.G. (2018). Pathogenicity of Leptographium terebrantis to saplings of Pinus taeda L.: Efficacy of the toothpick inoculation approach. Phytopathology 108 (10)***

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)

- ***Accomplishment: There were no new extra-mural funding grants secured for FY19. However, the Nursery Cooperative received $17 000 from companies willing to test materials.***

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)

- ***Accomplishment: Nursery Cooperative Staff were involved with 4 regional and national forest research cooperatives.***

    - ***Presented and attended the Southeastern Forest health research cooperation meeting (Enebak and Nadel). Gainesville, Florida. 20th of February 2019***

    - ***Presented and attended the Joint Annual Meeting: Northeast and Southern Forest and Conservation Nursery Associations (Nadel). Atlantic City, New Jersey, 22 – 25 July 2019,***

    - ***Presented and attended the Joint Meeting of the Forest Nursery Association of British Columbia and the Western Forestry Conservation Nursery Association (Nadel). Sidney, British Columbia Canada 30 September - 2 October 2019.***

    - ***Attended the Joint Annual Meeting of the Western Forestry and Conservation Nursery Association and the Intermountain Container Seedling Growers Association (Nadel). Coeur d'Alene, Idaho, 25 – 26 October 2018***