

Southern Forest Nursery Management Cooperative



FY 2012 Annual Report

ANNUAL REPORT

FY 2012

(October 1, 2011 - September 30, 2012)

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AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

MEMBERSHIP LIST

November 2012

Full Members:

The States of

Arkansas
Georgia
Louisiana
North Carolina
Oklahoma
South Carolina
Tennessee
Virginia

Forest Industry

Plum Creek Timber Company
Rayonier
Weyerhaeuser

Non-Industrial – Private

ArborGen, LLC
International Forest Company
Williams Forestry and Associates
Campbell Timberland Management

USDA Forest Service

Associate Members:

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

EXECUTIVE COMMITTEE

Service Rotation
November 2012

<u>FISCAL YEAR</u> [†]	<u>Member 1</u>	<u>Member 2</u>	<u>Member 3</u>
2012	Tennessee	North Carolina	Arkansas
2013	North Carolina	Arkansas	South Carolina
2014	Arkansas	South Carolina	Weyerhaeuser
2015	South Carolina	Weyerhaeuser	Virginia
2016	Weyerhaeuser	Virginia	ArborGen
2017	Virginia	ArborGen	Louisiana
2018	ArborGen	Louisiana	Forest Service
2019	Louisiana	Forest Service	Plum Creek
2020	Forest Service	Plum Creek	Georgia
2021	Plum Creek	Georgia	Rayonier
2022	Georgia	Rayonier	Oklahoma
2023	Rayonier	Oklahoma	IFCo
2024	Oklahoma	IFCo	Campbell Timberland
2025	IFCo	Campbell Timberland	Native Forest Nursery
2026	Campbell Timberland	Native Forest Nursery	Tennessee
2027	Native Forest Nursery	Tennessee	North Carolina
2028	Tennessee	North Carolina	Arkansas
2029	North Carolina	Arkansas	South Carolina
2030	Arkansas	South Carolina	Weyerhaeuser
2031	South Carolina	Weyerhaeuser	Virginia
2032	Weyerhaeuser	Virginia	ArborGen

† Member 1 would conduct the Coop business meeting held in that fiscal year. For example, Tennessee conducted the business meeting for FY12.

THE EIGHT FUNDAMENTAL RULES OF ANTI-TRUST COMPLIANCE

1. Competitors may not agree on prices they charge for goods they sell.
2. Competitors may not agree on the prices they charge for services.
3. Competitors may not agree on terms of sale.
4. Companies may not use dominant market position to monopolize a market, control prices, or exclude competitors.
5. Competitors may not agree not to compete by allocating customers, territories, or markets.
6. Competitors may not agree not to compete on bids – i.e. bid-rigging.
7. Competitors may not agree on prices for products or services they buy.
8. Competitors may not join in a boycott of suppliers or customers to accomplish anti-competitive ends.

Rules and Policies for the Auburn University Southern Forest Nursery Management Cooperative

Approved November 1997

MEMBERSHIP

1. Full membership in the Cooperative is open to companies with domestic operations and state and federal agencies that operate a forest tree nursery. Associate membership in the Cooperative is open to domestic companies that do not operate forest tree nurseries but plant forest tree seedlings. Associate membership in the Cooperative is also open to manufacturers and distributors of commercial products used in the production of forest tree seedlings in container or bare-root nurseries.
2. Full members are required to pay annual dues. Associate members are required to pay one-half the dues set each year for full members.
3. Voting rights will be granted to full members only.
4. Membership is for one year. Membership may be terminated by either the member organization or by Auburn University by giving 60 days written notice before October 1.
5. Membership will be contingent on signing a memorandum of agreement with Auburn University.

ORGANIZATION

6. The Dean, School of Forestry, Agricultural Experiment Station of Auburn University in consultation with the Coop Executive Committee, will appoint the Cooperative's Director. The Director will be responsible for:
 - A. Directing the activities of the Cooperative;
 - B. Employing a competent staff;
 - C. Developing the Cooperative's direction in conjunction with the Advisory Council;
 - D. Ensuring each member participates to a threshold level; and
 - E. Reporting research accomplishments to the Advisory Council
7. An Advisory Council consisting of one representative from each cooperating organization shall be established to:
 - A. Act as a liaison between the organization and the Director;
 - B. Develop Cooperative policies;
 - C. Advise the Director on the Cooperative's direction;
 - D. Approve the annual budget and membership fee.

- E. The Advisory Council will have an annual meeting in the first quarter of each fiscal year.
8. An Executive Committee consisting of three Advisory Council members and the Director shall have the authority to meet and conduct routine business in the name of the Advisory Council. One Executive Committee member will be appointed annually according to a rotating schedule and will serve for 3 years. The Advisory Council chairman will be the senior member of the Executive Committee and will preside at the Executive Committee and Advisory meetings. Associate members are not eligible to serve on the Executive Committee.
 9. Contact representatives will be designated by each cooperating organization. This individual may or may not be the same person serving on the Advisory Council. Contact Representatives will be directly involved in research established with each member organization. A meeting of contact representatives will be held in the 3rd quarter of each fiscal year.
 10. All data will be available to all members in the Cooperative.

DUES and BUDGET

11. Membership fees will be set by the Advisory Council at its annual meeting. Recommended fees will be computed annually by the Executive Committee based on the consumer price index (CPI) for the previous year, and will become effective October 1 of the following year.
12. The Cooperative will operate on the fiscal year October 1 to September 30. Invoices for membership fees will be sent to all member organizations on October 1 of each year, or by special arrangement with the individual organization.
13. When a Cooperative member is acquired by another member organization, all, two-thirds, and one-third of the full membership fee will be paid for the lost member the first, second, and third years after acquisition, respectively, by the continuing member.

RULES CHANGES

14. Changes in, deletions from, and additions to the membership rules may be adopted by a two-thirds vote of advisory members in attendance at regularly scheduled or special sessions of the Advisory Council.

DIVISION OF RESPONSIBILITIES BETWEEN AUBURN
UNIVERSITY AND MEMBER ORGANIZATIONS
IN THE AUBURN UNIVERSITY SOUTHERN FOREST
NURSERY MANAGAMENT COOPERATIVE

1. Study plans will be developed by Auburn University in conjunction with the Cooperative's Technical Committee. Responsibilities will be delineated in individual study plans.
2. Auburn will do all data analysis and processing, as well as manuscript preparation, and will insure timely distribution of results to cooperators.
3. Auburn will be responsible for developing a procedure for uniform soil testing and analysis.
4. Auburn will act as a clearinghouse on current nursery management research and will disseminate appropriate information on these practices.
5. Auburn University graduate students will be utilized to work on specific problems.
6. All cooperators will be responsible for adhering to the study plans.

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY13 ADVISORY MEETING AGENDA

Wednesday, November 14, 2012

<u>TIME</u>	<u>EVENT</u>	<u>SPEAKER</u>
11:00 – 1:00	Registration	SFWS Conference Hall - 1101
1:00 – 1:05	Welcome to Auburn	
1:05 – 2:00	FY11 Accomplishments	Scott Enebak – SFWS
2:00 – 2:15	Who am I	Ben Whitaker - SFWS
2:15 – 3:00	Fumigation Rules, Training Handlers, MBr Label Update & 2013 REDs	Scott Enebak - SFWS
3:00 -3:30	BREAK	SFWS Conference Hall - 1101
3:30– 3:45	Why TES-3 may be a good option.	Tom Starkey - SFWS
3:45 – 4:15	MBR Alternative Trials , Forest Stewardship Council (FSC) Certification & CAFS	Scott Enebak - SFWS
4:15- 4:30	Summary of MBAO meeting	Tom Starkey - SFWS
4:30 – 5:00	Nursery Production Survey	Scott Enebak - SFWS
5:00 – 5:30	Study Plan Discussion	Nursery Cooperative
5:30 – 8:00	BBQ Dinner and Social	SFWS Pavilion

Thursday, November 15, 2012

<u>TIME</u>	<u>EVENT</u>	<u>SPEAKER</u>
7:15 – 8:00	Breakfast – Danish / Coffee / Juice	SFWS Conference Hall - 1101
8:00 – 8:30	Plant Disease Clinic Highlights	Tom Starkey - SFWS
8:30 – 9:00	RGP or RWR - what do they tell you?	Tom Starkey - SFWS
9:00 – 10:00	FY13 Work Plan Discussion	Scott Enebak & North Carolina
10:00-10:30	BREAK	
10:30 – 12:00	FY 13 Budget Discussion	Scott Enebak & North Carolina
12:00 ish	Adjourn	Have a safe trip home!

FY 2013 ADVISORY COMMITTEE MEETING
November 14 & 15, 2012

MINUTES

- 1) The FY 2013 Advisory Committee Meeting was opened at 1:00 p.m., Wednesday, November 14, 2011 by Scott Enebak, Director.
- 2) This is to serve as a reminder that all business is conducted according to the guidelines of anti-trust legislation (see page 7).
- 3) Those in attendance of the FY 2013 Advisory Committee Meeting were as follows:
Wayne Bell – International Forest Company
James West – NC Division of Forest Resources
John Conn – Tennessee Division of Forestry
Mark Davis – Rayonier
Brad Miller – Weyerhaeuser (online)
Doug Shelburne – Weyerhaeuser
Doug Sharp – Plum Creek Timber Company
Tim Adams – South Carolina Forestry Commission
Steve Cantrell – ArborGen
Allan Murray – Arkansas Forestry Commission (online)
Paul Ensminger – Williams Forestry and Associates
Kim Mushrush – Williams Forestry and Associates
Barry Brooks – AU SFWS
Ben Whitaker – AU SFWS
Elizabeth Bowersock – AU SFWS
Scott Enebak, Director – AU SFWS
Tom Starkey – AU SFWS
- 4) Please see page 13 for the FY2013 Advisory Committee Meeting Agenda. The following presentations were made on Wednesday afternoon or Thursday morning as noted in the Agenda:
 - a. Fumigation Rules, Training Handlers, MBr Label Update & 2013 REDs – Scott Enebak, Director
 - b. Why TE-3 May Be a Good Option – Tom Starkey, SFWS
 - c. MBr Alternative Trials, Forest Stewardship Council (FSC) Certification & CAFS – Scott Enebak, Director
 - d. Summary of MBAO Meeting – Tom Starkey, SFWS
 - e. Nursery Production Survey – Scott Enebak, Director
 - f. Plant Disease Clinic Highlights – Tom Starkey, SFWS
 - g. RGP or RWR: What Do They Tell You? – Tom Starkey, SFWS
- 5) The FY 2013 Business Meeting of the Auburn University Southern Forest Nursery Management Cooperative was called to order at 8:45 a.m. on Thursday, November 15, 2012, by James West of the North Carolina Forest Service. Cooperative Members as

listed on page 15 of this Annual Report were present. All members present concurred unanimously to begin the meeting. Topics of the FY13 Work Plan were discussed and voted upon as follows:

Goal A.

Objective 1.

a. Methyl Bromide Substitution

Discussion:

- Doug Sharp – What about the other alternatives? We're only testing TE-3? Control is no fumigation? Starkey – No, it's MBr (control). Only testing TE-3 this round because everything else has already been tested.
- Shellman and one other nursery.

Motion to Approve: Paul Ensminger

2nd: Steve Cantrell

Unanimous Approval

b. Herbicide Trials

Discussion:

- James West – Pre-e to loblolly? Ben Whitaker – Yes.
- John Conn – Pines or hardwoods? (Galls) Ben – Pines.
- Doug Sharp – Why irrigated? Ben Whitaker – Non-irrigated represents a more realistic outplanting.
- Doug Shelburne – Would you consider one more treatment on tank-mix? Ben – We could.
- Add Agri-lock to tank mix?? # of nurseries – Camden?, Jesup – two different soil types = good
- Paul Ensminger – Goal on hardwoods? Container?

Motion to Approve: Wayne Bell

2nd: Steve Cantrell

Unanimous Approval

c. Fusiform Rust Control

Discussion: None

Unanimous Approval

Objective 2.

d. Plant Growth Regulators

e. Eucalyptus Planting Depth

f. Root Electrolyte Leakage

Discussion:

- Wayne Bell – Tom, I really encourage you to interact with NC State as they have eucalyptus experience.
- Brad Miller – Plant growth regulators and loblolly? Tom – We got a phytotoxic response, but from a cost standpoint, it's going to be hard to beat top-clipping in pines. But we can look at it.
- Brad Miller – Looking for options to jump start lob that have stalled early in growing season.

Motion to Approve: Wayne Bell

2nd: Steve Cantrell, John Conn

Unanimous Approval

Objective 3.

- g. Longleaf Pine Understory Plant Propagation & Establishment

Objective 4.

- h. Determination of Soil Water Retention Curve

- i. Tap Root Development in Longleaf Pine

Discussion:

- Wayne Bell – Include as much information and as many players as possible (Susanna Song). Use current technology and let people know what we do and that we are seedling experts.

Motion: John Conn

2nd: Wayne Bell

Unanimous Approval

Discussion:

- John Conn – Mycorrhizae studies? We fall fumigate and I think we pay a lot more to preparing our ground and our fumigation is more effective to the point where it's killing micorrizhae

Goal B.

Objective 1.

- a. Methyl Bromide
- b. Revision of Ag Handbook 473/Hardwood Nursery Guide
- c. Reregistration of Nursery Pesticides
- d. Maintain and Update Nursery Cooperative Website
- e. Leveraging of Nursery Cooperative Data

Objective 2.

- a. Contact Meeting
- b. Research Reports
- c. Newsletters

Objective 3.

- a. Individual and Organization Contacts
- b. Production Survey
- c. Short Course

Goal C.

Objective 1.

- a. Advisory Committee Meeting
- b. Nursery Cooperative Membership
- c. Pesticide Label Restrictions
- d. Update Coop Membership and Nursery Directories

Objective 2.

- a. Presentations at Meetings
- b. Publications
- c. Extramural Funding of Nursery Coop Projects
- d. Interaction with other Research Cooperatives

Discussion:

- Wayne Bell – How many members?
- Scott Enebak – We have 16. Is there a better location to hold this meeting for more participation? It's really the States that aren't showing up – due to limited budgets, etc. We could do everything online, but in person seems so much better.

Unanimous Approval

BUDGET

USDA Areawide

Annual Budget

- John Conn - Why are salaries less than projected? Enebak – Because the Dean of SFWS picked up a little more than we were originally told.
- Paul Ensminger – The projected budget: does it include the \$21,000 that we're expecting? Enebak – No, because I don't project that.
- John Conn – What does that \$21,000 consist of? It doesn't seem to add up counting just dues. Enebak – It consists of the site license, plus Rayonier paying for the buyout of another member.
- John Conn – Why are the salaries lower for next year than this year? Enebak – We have already accounted for this year's supplement to be given in December.

Motion: Mark Davis

2nd: John Conn

Unanimous Approval

- 6) The FY 2011 Business Meeting of the Auburn University Southern Forest Nursery Management Cooperative is adjourned as of 10:42 a.m., Thursday, November 15, 2012.

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2012 BUDGET - PROJECTED VERSUS ACTUAL

(October 2012)

FISCAL YEAR
(Oct. 1, 2011 - Sept. 30, 2012)

	<u>FY 12</u> <u>(Projected)</u>	<u>FY 12</u> <u>(Actual)</u>	<u>Difference</u>
REVENUE			
Carryover from Previous Year	230,050	230,050	0
Current Year's Income	164,000	143,000	(21,000)
Total Revenue	394,050	373,050	(21,000)
EXPENDITURES			
Personnel Costs			
Professional/Non-Faculty - Tom Starkey (61.83%)	47,173	45,976	1,197
Professional/Non-Faculty -Elizabeth Bowersock (50%)	20,282	19,501	781
Technicians	0	0	0
Graduate Students	0	0	0
Student Labor - 1@\$7.25/hr x 20hrs/week x 52 wks	7,540	1,528	6,012
Employee Benefits (27.5%)	18,550	17,264	1,286
Total Personnel Costs	93,545	84,269	9,276
Operating Costs			
Travel	10,000	10,787	(787)
Vehicle Mileage	8,000	4,453	3,547
Supplies	10,000	8,428	1,572
Equipment	4,000	0	4,000
Total Operating Costs	32,000	23,430	8,570
Total Expenditures	125,545	107,699	17,846
CARRYOVER FOR NEXT YEAR	268,505	265,351	(3,154)

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

THREE YEAR FINANCIAL STATEMENT

(October 2012)

	FISCAL YEAR		
	October 1 - September 30		
	<u>FY13</u>	<u>FY14</u>	<u>FY15</u>
	(Projected)	(Projected)	(Projected)
REVENUE			
Carryover from Previous Year	265,351	255,817	206,999
Current Year's Income	165,775	163,450	169,250
Total Revenue	431,126	419,267	376,249
EXPENDITURES			
Personnel Costs			
Research Fellow - Tom Starkey; 61%	48,649	47,125	47,125
Technicians - Barry Brooks; 100% (7 mos)	21,105	36,181	36,181
Clerical Staff - Elizabeth Bowersock; 50%	23,543	22,638	22,638
Research Fellow – Ben Whitaker 100% (7 mos)	22,750	39,000	39,000
Graduate Students	0	0	0
Student Labor - 1@\$7.25/hr x 20hrs/wk	1,885	1,885	1,885
Employee Benefits (27.9%)	32,377	40,439	40,439
Total Personnel Costs	150,310	187,267	187,267
Operating Costs			
Travel	10,000	10,000	10,000
Vehicle Mileage	5,000	5,000	5,000
Supplies	8,000	8,000	8,000
Equipment	2,000	2,000	2,000
Total Operating Costs	25,000	25,000	25,000
Total Expenditures	175,310	212,267	212,267
CARRYOVER FOR NEXT YEAR	255,817	206,999	163,982

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FIVE YEAR PROJECTED PLANNING BUDGET

(October 2011)

	\$9,300 FY13	\$9,300 FY14	\$9,800 FY15	\$9,800 FY16	\$10,300 FY17
<u>Revenue (000s)</u>					
Carryover	265.4	255.8	207.0	164.0	118.5
Income	165.8	163.5	169.3	166.8	164.8
Total	431.1	419.3	376.2	330.8	283.3
<u>Expenditures</u>					
Personnel/Benefits	148.4	185.4	185.4	185.4	185.4
Student Labor	1.9	1.9	1.9	1.9	1.9
Graduate Student	0.0	0.0	0.0	0.0	0.0
Travel	15.0	15.0	15.0	15.0	15.0
Supplies	8.0	8.0	8.0	8.0	8.0
Equipment	2.0	2.0	2.0	2.0	2.0
Total	175.3	212.3	212.3	212.3	212.3
<u>Carry Over Balance</u>	255.8	207.0	164.0	118.5	71.0

Members

16	Full	\$500 Dues increase every other year beginning in FY 2011
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AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2012 USDA AREAWIDE BUDGET PROJECTED VERSUS ACTUAL

(thru September 30, 2012)

FISCAL YEAR
(Oct. 1, 2011 - Sept. 30, 2012)

	<u>FY12</u> (Projected)	<u>FY12</u> (Actual)	<u>Difference</u>
REVENUE			
Carryover from Previous Year	100,128	154,093	53,965
Income	0	0	0
Total Revenue	100,128	154,093	53,965
EXPENDITURES			
Personnel Costs			
Research Assistant – Paul Jackson	27,124	37,503	(10,379)
Technician - Barry Brooks	35,165	45,836	(10,671)
Student Worker	0	0	0
Employee Benefits – 27.5%	17,129	25,173	(8,044)
Total Personnel Costs	79,418	108,511	(29,093)
Operating Costs			
Travel	0	1,394	(1,394)
Vehicle Mileage	0	381	(381)
Supplies	0	1,763	(1,763)
Training Program	25,000	0	25,000
Equipment	0	0	0
Total Operating Costs	25,000	3,538	21,462
TOTAL EXPENDITURES	104,418	112,049	(7,631)
CARRYOVER FOR NEXT YEAR	(4,290)	42,044	

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2012 ACCOMPLISHMENTS

**As Presented to the Southern Forest Nursery Management
Cooperative Advisory Committee
November 14-15, 2012**

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2012 ACCOMPLISHMENTS

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

Third growing season data will be collected from the USDA Areawide fumigation trial (2010-2012) at Weyerhaeuser's Pine Hill Nursery in Camden, AL that is testing lowered rates of the fumigants MBr, chloropicrin, Chlor 60, and Pic+ under totally impermeable film (TIF).

A fumigation trial testing a combination of soil fumigants as a methyl bromide alternative will be conducted at in a member nursery. Depending upon the nursery, either spring fumigation or fall fumigation will be used. It is possible that a demonstration plot for the 2012 SFNA meeting in Chattanooga, TN will be installed. The study will use high barrier plastics and reduced fumigant rates to comply with the new soil fumigation rules. (Jackson/Starkey/Enebak)

- *Accomplishments: This is the third and final growing season to collect data at Weyerhaeuser's Pine Hill Nursery in Camden, AL. The final seedling data will be collected before the end of the year. Then after analysis, a final Research Report will be written ending the 5-yr USDA Areawide MBr Alternative Program.*
- *One nursery applied TES-3 as a Nursery Watch Trial with promising results. This same nursery will be fumigating 4-5 acres again with TE-3 in Oct/Nov 2012.*

Herbicide Trials

A number of herbicide trials will be installed to examine the effects of herbicides on specific weed pests and seedling quality.

- Ronstar Flo® will be tested as a pre-emergence application along with post-emergence applications of other herbicides (to be determined) to control annual sedge at the Weyerhaeuser nursery at Aiken, SC. (Jackson/Brooks)
- *Accomplishments: Ronstar Flo® was included in six of nine treatments that also included treatments of Goal®, Cobra®, Certainty®, and Pendulum® Aquacap™ which were applied both pre- and post-emergence and in various tank mixes to loblolly*

pine seedlings at Aiken, SC in order to determine annual sedge control and seedling tolerance. Data will be collected in Fall 2012.

- Pendulum AquaCap and Pendulum 3.3 EC will be tested as pre-emergence and post-emergence applications to loblolly pine in order to gather more data on herbicide gall formation. (Jackson/Brooks)
- *Accomplishments: Pendulum® Aquacap™ at 0.5, 1, and 2 lb/acre were applied to loblolly pine seedlings both pre- and post-emergence to further assess the potential for herbicide gall formation over a range of rates (0.5 lb/acre never tested previously) and at two application times at Aiken, SC, Shellman, GA, and Chatsworth, GA. Data will be collected. Pendulum® Aquacap™ (PAC) was also tested pre-emergence to hardwoods of various seed sizes at 0.5, 1, and 2 lb/acre to determine on seedling density and quality. PAC was applied to silver maple, sweet gum, and sycamore at Chatsworth, GA and black gum, green ash, red maple, and pear at Shellman, GA.*
- The herbicide clopyralid (Stinger®) will be tested along with other diphenyl ether herbicides (possibly as tank mixes) for control of eclipta in production beds at the East TN nursery at Delano, TN. (Jackson/Brooks/Conn)
- *Accomplishments: Stinger® was not tested for eclipta control at Delano, TN in 2012. Trials at TN focused on morning glory control and hardwood seedling tolerance.*
- An herbicide trial will be conducted at the East TN nursery at Delano, TN targeting morning glory in hardwood beds. (Jackson/Brooks/Conn)
- *Accomplishments: Pendulum® Aquacap™ and Dismiss® were tested post-emergence to common persimmon, hazelnut, and plum at Chatsworth, GA and swamp chestnut oak, willow oak, and water oak at Delano, TN. Broadstar® was also tested post-emergence to swamp chestnut oak at Delano, TN and persimmon at Chatsworth, GA. Based on positive results for morning glory control from the post-emergence Dismiss® applications, the TN nursery staff installed operation trials with Dismiss® using a directed applicator. Species tested included willow oak, pin oak, water oak, cherrybark oak, southern red oak, persimmon, paw-paw, water tupelo, overcup oak, shumard oak, sawtooth oak, and nuttall oak. TN nursery personnel are recording observational data and have been relaying it to Nursery Cooperative staff.*

In addition, a greenhouse trial using Pendulum® Aquacap™, Dismiss®, and Broadstar® was installed at Auburn University to potted morning glory in two different soil types to determine weed control. Fresh weights of morning glory were collected within 30 days of treatment to quantify weed control. The greenhouse trials have been taken down and data will be put into a Research Report.
- Sporotec®, a compound used to control moss and liverwort in container nurseries, will be tested to determine its effectiveness on knawel (*Scleranthus annuus*) at the Claridge Nursery in Goldsboro, NC. (Jackson/Brooks/West)

- *Accomplishments: Sporatec® was not tested as knawel weed was not a problem at Goldsboro, NC or other container nurseries in 2012.*
- A greenhouse trial will be repeated on loblolly pine seedlings in order to confirm results from a 2011 trial that investigated herbicide gall formation by direct application of Pendulum Aquacap® to the media, stem, or foliage. (Jackson/Brooks)
- *Accomplishments: Due to Paul Jackson's departure, the seedlings propagated for this trial were dedicated to another trial before any Pendulum® AquaCap™ treatments were applied.*
- Matrix® will be tested as a post-emergence applications on loblolly pine to control nutsedge at the Flint River nursery at Bryomville, GA. (Jackson/Brooks/Fields)
- *Accomplishments: Matrix® was tested post-emergence to loblolly pine seedlings at two rates to determine seedling tolerance and control of post-emergence nutsedge plants at Flint River, GA. Data will be collected Fall 2012.*

Fusiform Rust Control

Inoculation studies will be conducted to examine the efficacy of rust inhibiting fungicides for the control of fusiform rust on loblolly pine. Further studies will be conducted to examine the efficacy of soybean rust inhibiting fungicides for the control of fusiform rust on loblolly pine. Due to the low inoculation spore level in 2011, this study will be repeated in 2012 testing the same chemicals: 1. Proline® 2. Compass® (Flint®) 3. Stratego® 4. Insignia®. This study will be done in cooperation with the USDA Rest Screening Laboratory in Asheville, NC. Study Dates: April 2012 – Jan 2013. (Starkey/ Enebak)

- *Accomplishments: Seedlings which were germinated and sprayed with Bayleton, Proline, Compass (Flint) and Insignia for foliar assessment. Seed treatments, included Bayleton, and 5 rates of Proline to determine lowest effective seed-treatment rate. Seedlings were taken to the USFS Rust Center in Asheville in May, 2012 where they were challenged with rust spores and held for 6 months to evaluate. Data on fungicide control was collected in October and will be written up in a Research Report.*

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

Biological Control of Nematodes

Controlling nematodes during the second year following fumigation has been a problem and concern for several nurseries. *Pasteuria* spp. bacteria are nematode species specific and have been registered by EPA to control sting nematode on turf grass and strawberries. A nursery trial will be established if stunt nematodes are confirmed in early 2nd year land. Study Dates: Nov 2011 to Sept 2012. (Starkey/Jackson/Enebak)

- *Accomplishments: There were no reports of nematode issues/concerns with member nurseries in 2nd year production fields thus, this trial was not installed.*

Plant Growth Regulators

An evaluation of several plant growth regulators will be conducted on container eucalyptus. Study Dates: May 2012 – Feb 2013. (Starkey/Keever (Horticulture)/ Enebak)

- *Accomplishments: Eucalyptus (in addition to pine) were sprayed with two concentrations each of cyclohexaketone (Augeo), paclobutrazol (Bonzai), benzyladenine (BAP-10), and flurprimidol (Topflor) to determine possible phytotoxicity and efficacy. Seedlings continue to be monitored for treatment effects.*

Evaluation of Root Gel Application Method

An evaluation of water pressure used to apply root gels during lifting will be studied by evaluating seedling root growth potential (RGP) following application. At least 2 nurseries will be used for these studies. Study Dates: Jan 2012 – Mar 2012. (Starkey/Enebak)

- *Accomplishments: Two nurseries with two different gel application methods were selected and seedlings with gel, water only and no water or gel were collected and RGP evaluated. Data from the two application methods will be put into a Research Report.*

Bark Amendments and Seed Efficiency

Trials to determine the relationship between the use of pine bark mulch and loblolly pine seed efficiency will be conducted to expand on results from a 2011 trial that showed increases in seed efficiency with additions of bark mulch. (Jackson/Starkey)

- *Accomplishments: Mulch treatments included mulch at sowing, mulch applied 6 weeks post-sowing and mulch applied 10 weeks post-sowing and no mulch. Seedling counts and seedling quality data were collected and information on treatments will be put into a Research Report.*

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.

Soil Nutrition Expert System

Nursery Cooperative will continue to modify the Excel spreadsheet computer-based soil nutrition decision making system that was designed with the help of Dr. Chuck Davey. Additional work is

needed to update the system to incorporate soil pH and chlorosis due to high soil manganese. The Director will work with David to complete this process. (South)

- *Accomplishments: David South has completed the updates on the Excel Spreadsheet for soil recommendations. If anyone is interested in getting a copy of the Beta Version, let the Director know. It is also understood that JB Jett of Raleigh, NC has picked up soil nutrition recommendations from Dr. Chuck Davey.*

Longleaf Pine Understory Plant Propagation and Establishment

The Nursery Cooperative was approached by the Forest Service to determine new and operational techniques for the propagation and establishment of longleaf pine understory plant species using herbicides. The following trials will be conducted but will not use Nursery Cooperative Funds. (Jackson/Brooks)

- Herbicide tolerance trials using different wiregrass sources are proposed to be done at Auburn University in the Nursery Cooperative's seedling stress facility and in the field.
- *Accomplishments: Wiregrass trials were not performed at Auburn University in 2012. Additional outside funding has been acquired and the recruitment of a graduate student to carry out this work is ongoing.*
- Herbicide tolerance trials using a range of longleaf pine understory plant species are proposed to be done at the Claridge Nursery in Goldsboro, NC. Other trials at the nursery will involve seed handling and outplanting techniques.
- *Accomplishments: Trials with container wiregrass and muhly grass seedlings were installed at Goldsboro, NC that included post-emergence treatments at both 2 and 7 weeks post-sowing with Pendulum® Aquacap™, Goal®, Cobra®, and Ronstar Flo®. An additional trial was installed at the NC nursery on outplanted wiregrass that included treatments of Pendulum® Aquacap™, Goal®, Cobra®, and Stinger®. The herbicide injury ratings and seedling fresh weights have been recorded and the trials have been taken down. Paul Jackson (LA Tech) will continue to be involved in this project with Scott Enebak.*

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

Lenticel Development in Southern Pine Species

This study will be repeated in FY2012. Lenticels are a common occurrence on seedlings that have been subject to high soil moisture and occur in all soil types. We do not know how many days of high soil moisture are necessary for lenticels to develop, thus we proposed to conduct a greenhouse study using bareroot and container loblolly and slash pine to answer this question. Seedling root

growth potential and recovery time will be determined in Nursery Cooperative's Stress Boxes. Study Dates: July 2012 – Nov 2012. (Starkey/Enebak)

- *Accomplishments: Seedlings were collected in July and transplanted to 1 gallon pots containing nursery soil. After seedling establishment, treatment seedlings were placed in conditions favoring lenticel and anaerobic root development. After lenticel initiation seedlings were evaluated for RGP immediately, 1-week post-lenticel development, 2-weeks post lenticel development, and 3- weeks post lenticel development. A 2 and 3-week RGP recovery time was also included.*

Determination of Soil Water Retention Curve

This is a nursery requested study. Soil water retention curves can help nursery managers who wish to use tensiometers make decisions about irrigating their crop more objectively. The soil water retention curves that represent a range of soil types among member nurseries will be calculated. Study Dates: Jan 2012 – Nov 2012. (Starkey/Enebak)

- *Accomplishments: Soils were collected from four different nurseries and data for the soil water retention has been collected. However due to problems attempting to duplicate nursery soil bulk densities different methodology will be used next year to verify this year's data.*

Evaluation of Historical Temperature Data

Warm night/day temperatures in the winter months can cause seedling deacclimation and result in freeze injury. Have the occurrences of these episodes increased in recent years or have they always occurred. We are currently downloading temperature data from for the last 100 years from two locations in zone 7b and two locations in zone 8a for AR, SC, GA, AL, MS, LA and east TX. The frequency of the deacclimation events will be examined. (South/Starkey)

- *Accomplishments: We continue to examine the data for temperature trends that affect seedling survival and quality.*

GOAL B: TECHNOLOGY TRANSFER

Objective 1. Serve as a clearinghouse of information related to nursery production and tree planting.

Nursery Practices Survey

A survey of nursery practices in bareroot and container seedlings in the southern United States will be sent to members and nonmembers in May/June 2012. This survey will update current nursery practices and assist the Nursery Cooperative in collecting necessary data requested by EPA and other government agencies. Study Dates: January to November 2012. (Starkey/Enebak/Jackson).

- *Accomplishments: Surveys were sent to 46 bareroot and 20 container nurseries representing both Nursery Cooperative members and nonmembers in the southern region. Approximately 46 completed surveys have been returned. A higher percentage of bareroot nurseries returned their surveys than container nurseries. Data is being processed by Nursery Cooperative staff and the results will be published next year.*

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 new soil fumigation rules to be released in spring 2012. (Starkey/Enebak)

- *Accomplishments: Participated in monthly conference calls involving the MBIP and CMTF that updated stakeholders on EPA's progress of Risk Mitigation as it pertains to REDs, handler training and buffer zone rules.*
- *Discussed with EPA the status of the CUE process and questioned their reasoning for the Forest-Seedling rejection and possibility of renewing Forest Seedling CUE applications.*
- *Worked with Dwight Stallard and the VA Department of Agriculture to finalize QPS rules for Virginia.*
- *There have been no requests for information from EPA on any pesticide registration.*

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

In collaboration with our USFS partners and with input from Nursery Cooperative membership will continue to coordinate, compile and edit the Hardwood Manual with a final publication date of Summer of 2012 (McNabb/Bowersock)

- *Accomplishments: Authors have been identified and currently 12 of 15 chapters have been turned in for coordination and editing by Ken McNabb and Elizabeth Bowersock. Deadline for to get to the publisher was Summer 2012, however, the lack*

of progress by three authors has delayed the publication of the Hardwood Manual. This manual will go to the printer at the end of 2012.

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. These include Barricade (prodiamine), Broadstar (flumioxazin) and Medallion (fludioxonil) (Enebak/Starkey/Jackson)

- *Accomplishments: The full label registration for the use of Proline was approved in December, 2011 by EPA. Label of use information was presented to the membership by both email and at the 2012 Contact Meeting.*
- *This past year 3 pesticides were scheduled to undergo review. They are: prodiamine, Barricade (Herbicide), flumioxazin, Broadstar (Herbicide) and fludioxonil, Medallion (Fungicide). To date, we have not had any requests from EPA for additional information.*

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)

- *Accomplishments: The website is updated with Contact Meeting & Advisory Agenda's with each speaker's presentation available for Nursery Cooperative Members. Research Reports and Technical Notes are updated and is "searchable" by topics. Changes in Nursery Cooperative staff updated and current.*

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 is in year 2 of a 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 will be used towards Elizabeth Bowersock's salary to compensate for her time.*
- *Three grant proposals were submitted by Nursery Cooperative personnel that used Nursery Cooperative funds as a match/leverage. These included one to the Center for Advanced Forestry Systems (CAFS). If approved, Auburn University will be the "member" site and we will share \$60,000 annually with the Forest Health Cooperative*

The second proposal went to the USFS Special Technical Development Project - Pitch Canker – This proposal will compare the multi-loci genetic marker developed for a rapid screening process that can be used to examine both seed and planting material for the presence and absence of the pitch canker fungus. The proposal is for three years and is for \$63,000 per year to bring on a post-doctoral student to develop a method to screen pine seed for pitch canker infestation. The third proposal went to the Alabama Commerce Grant to determine if what the costs (inputs) might be to produce forest tree seedlings without MBr and assess the effectiveness of pest control programs in the production of loblolly pine seedlings for reforestation of forest lands. This grant was for \$73,000 annually for three years to pay for the salaries of Dr. Starkey, Barry Brooks and Paul Jackson's replacement.

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 ½ day program in conjunction with, but prior to the biennial Southern Forest Nursery Association meeting which will be held in Chattanooga, Tennessee on Monday July 16, 2012. As part of the program, a nursery tour will be held at the Native Forest Nursery in Chatsworth, GA (the old Bowater Nursery). The agenda will cover presentations by Nursery Cooperative staff on current activities and results.
(Enebak/Bowersock)

- *Accomplishments: The 2012 Nursery Cooperative Contact meeting was held in conjunction with the Northeast Forest and Conservation Association and the Southern Forest Nursery Association on July 16-19, 2012 in Chattanooga, TN. The Nursery Cooperative portion of the meeting was attended by 44 Nursery Cooperative members. In addition, Nursery Cooperative staff presented information to the entire group on soil fumigation history, the use of Proline and was involved with both nursery tours that were conducted at the Native Forest Plants nursery in Chatsworth, GA and the East Tennessee State Nursery in Cleveland, TN.*

Research Reports (Staff)

We plan on producing Research Reports and Technical Notes in FY12.

- *Accomplishments: The following Research Reports and Technical Notes were prepared, published and distributed to Nursery Cooperative Members in FY12.*
- *Screening of Pendulum® AquaCap™ and Tower® herbicides on pine seedbeds. Jackson, D.P. and D.B. South. 2012. Southern Forest Nursery Management Cooperative, School of Forestry and Wildlife Sciences, Auburn University. Research Report 12-01.*

- *Foliar nutrient survey of loblolly and longleaf pine seedlings. Tom Starkey and Scott Enebak. Southern Forest Nursery Management Cooperative, School of Forestry and Wildlife Sciences, Auburn University. Research Report 12-02.*
- *Hardwood seedling tolerance to Pendulum® AquaCap™ applications. Jackson, D.P. and B. Brooks. 2012. Southern Forest Nursery Management Cooperative, School of Forestry and Wildlife Sciences, Auburn University. Research Report 12-03.*
- *Nursery lifter operation affects root growth potential of pine seedlings. Tom Starkey and Scott Enebak. Southern Forest Nursery Management Cooperative, School of Forestry and Wildlife Sciences, Auburn University. Research Report 12-04.*
- *Effects on herbicide gall formation and survival from applications of undiluted Pendulum® AquaCap™ to loblolly pine seedlings. Jackson, D.P. and B. Brooks. 2012 Southern Forest Nursery Management Cooperative, School of Forestry and Wildlife Sciences, Auburn University. Research Report 12-05.*
- *Control of Rhizoctonia foliar blight in forest seedling nurseries: A 3-yr Study. Tom Starkey and Scott Enebak. Southern Forest Nursery Management Cooperative, School of Forestry and Wildlife Sciences, Auburn University. Research Report 12-06.*

Newsletters

Newsletter distribution will be planned for March and September 2012. Members are encouraged to submit articles and organizational updates. (Staff)

- *Accomplishments: A Spring 2012 and Fall 2012 Newsletter was sent to all Nursery Cooperative Members in March and September, approximately 97 on the mailing list. Topics included:*

Contact and Advisory Meeting Update
Nursery Production Survey
Soil Fumigation Training Course
CUE and QPS Updates
Leadership 101
20 Years Ago
USDA Areawide Fumigation Trials
New Soil Fumigants
Longleaf Pine Cone Crop Failure
Improve Your Communication
Herbicide Tolerant Weeds

Proline is Registered!
Midas sales suspended.
Herbicide on Sedge & Eclipta
Soil Stabilizers
Nursery Practices Survey
Know Weeds!
The Future of Soil Fumigation
AquaCap vs 3.3 EC
Soil Microorganisms
Nursery Internships from AU
Nursery Retirees

Management Alerts

Timely and important information needed for nursery operations will be distributed via a Management Alert. (Staff)

- *Be alert to possible freeze injury conditions this winter. Tom Starkey. Management*

Alert 12-01.

- *Timing of Pendulum Aquacap application influences the chance of gall formation on seedlings. Paul Jackson. Management Alert 12-02.*
- *Start your pest management scouting for insects early. Tom Starkey. Management Alert. 12-03.*
- *Early Fungicide Application for Rhizoctonia Web Blight. Tom Starkey. Management Alert 12-04.*

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/Jackson/Enebak)

- *Accomplishments: The following numbers of contacts were made with Nursery Cooperative members.*

	Starkey	Jackson	Enebak
Phone calls	60	29	32
Letters	7	0	2
Emails	170	97	62
Site Visits	28	19	3
Diagnosis	21	2	9

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 2011 to 2012 planting season. Attempts will be made to increase the contacted nurseries for seedling production data. The survey will be sent out in June 2012. (Enebak/Bowersock)

- *Accomplishments: An updated mailing list that included 112 nurseries was mailed in May 2012 throughout the southern US to gauge seedling production for the 2011-2022 planting season. Data was compiled and put into Technical Note 12-01 which will be mailed to all participating nurseries.*

Short Course

The Nursery Cooperative will conduct a short course in Auburn for nursery personnel based on nursery requests. This will be in September 2012. (Staff)

- *Accomplishments. In July 2011, monies were secured from USDA ARS to help defray the travel costs of those that wish to attend the Short Course. A survey of Nursery*

Cooperative members in early 2012 indicated that there was a desire to hold the training when the final soil fumigant rules were in place. However, due to EPA and State Dept of Agriculture concerns about “training” and “licensing” we will not be able to conduct a training program that would be “accepted” by the various agencies of our member states. There is, however, an online training program designed by registrants and approved by EPA and the various state agencies that will be online before soil fumigation rules take effect. This training program will be required by all applicators and we encourage at least one member from each nursery become “trained” as an applicator.

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 FY13 Advisory Committee Meeting will be held on November 7-8, 2012. 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)

- *Accomplishments. Nursery Cooperative Advisory Meeting will be held in Auburn on November 14-15, 2012 and is one week later than usual to allow Dr. Tom Starkey to attend the annual Methyl Bromide Alternative Options meeting in Orlando, FL.*

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)

- *Accomplishments: Efforts continue to be made to get Kentucky back as a member with discussions with Tim Sheenan at the Northeast Nursery Association meeting and Westervelt Corporation out of Tuscaloosa, AL with Tommy Conwell who has expressed a desire to join in FY14 (Oct 2013).*

Pesticide Label Restrictions

If possible, the Nursery Cooperative staff will continue to investigate the possibility of restricting new pesticide labels to Nursery Cooperative members. (Enebak/Starkey/Jackson)

- *Accomplishments: No new chemistries were identified this year that would fit into a forest-seedling production system.*

Update the Coop Membership and Nursery Directories

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

- *Accomplishments: Nursery Cooperative Membership Directories were updated and sent to Cooperative Members in October.*

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)

Accomplishments: Nursery Cooperative staff at Auburn University presented 6 talks on nursery related topics to local and regional groups. Titles and topics are listed below.

- *Enebak, S.A. 40 years of Soil Fumigation Research and Review. Southern Forest Nursery Conference. July 17, 2012. Chattanooga, TN*
- *Jackson, D.P. Five Years of Methyl Bromide Alternatives Research in Forest Tree Nurseries. International Research Conference on Methyl Bromide Alternatives and Emissions Reductions, Nov 1, 2011, San Diego, CA.*
- *Starkey, T.E. Rhizoctonia Foliage Blight Control. Southern Forest Nursery Association. July 17, 2012. Chattanooga, TN.*
- *Starkey, T.E. The 10 Commandments of Seedling Survival, ArborGen Inc, Shellman, GA, May, 2012*
- *Starkey, T.E. Control of Rhizoctonia Foliar blight in forest seedling nurseries: A 3-yr study. Southern Forest Insect & Southwide Forest Disease Workshops, July 25, 2012. Charlottesville, VA.*
- *Starkey, T.E. The 10 Commandments of Seedling Survival, Rayonier Corp, Elberta Al, September 2012.*

Publications

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

Accomplishments: Nursery Cooperative staff at Auburn University published 16 manuscripts on nursery related topics. Titles and journals are listed below.

- *Enebak, S.A., Starkey, T.E. and M. Quicke. 2012. Effect of methyl bromide alternatives on seedling quality, nematodes and pathogenic soil fungi at the Jesup and Glennville Nurseries in Georgia: 2007-2008. Journal of Hort and Forestry. 4:1-7.*
- *Enebak, S.A. 2012. Pestaltiosis Foliage Blight. In: Cram, M.M, Frank, M.S., Mallams, K.M., Tech. Coords. Forest nursery pests, Agriculture Handbook 680. Washington, DC: USDA Forest Service: 52-54.*
- *Enebak, S.A., and Starkey, T. 2012. Brown Spot Needle Blight. In: Cram, M.M, Frank, M.S., Mallams, K.M., Tech. Coords. Forest nursery pests, Agriculture Handbook 680. Washington, DC: USDA Forest Service: 28-31.*
- *Enebak, S.A., and Starkey, T. 2012. Fusiform Rust. In: Cram, M.M, Frank, M.S., Mallams, K.M., Tech. Coords. Forest nursery pests, Agriculture Handbook 680. Washington, DC: USDA Forest Service: 41-44.*
- *Enebak, S.A., Starkey, T. and Gorden, T. 2012. Pitch Canker of Pines. In: Cram, M.M, Frank, M.S., Mallams, K.M., Tech. Coords. Forest nursery pests, Agriculture Handbook 680. Washington, DC: USDA Forest Service: 60-63.*
- *Jackson, D.P., R.K. Dumroese, and J.P. Barnett. 2012. Nursery response of container *Pinus palustris* seedlings to nitrogen supply and subsequent effects on outplanting performance. Forest Ecology and Management 265: 1-12.*
- *Jackson, D.P., S.A. Enebak, and D.B. South. 2012. Effects of *Pythium* species and time in cold storage on the survival of bareroot and container-grown southern pine seedlings. ISRN Ecology. Volume 2012, Article ID 874970: 10 p.*
- *Jackson, D.P., S.A. Enebak, and D.B. South. 2012. *Pythium* species and cold storage affect the root growth potential and survival of loblolly (*Pinus taeda* L.) and slash pine (*Pinus elliottii* Engelm.) seedlings. Journal of Horticulture and Forestry 4: 114-119.*
- *Jackson, D.P., Enebak, S.A. and South, D.B. 2012. Survival of southern pine seedlings after inoculations with *Pythium* and cold storage in the presence of peat moss. Forest Pathology. 42:44-51.*
- *Jackson, D.P., T.E. Starkey, and S.E. Enebak. 2011. Five years of methyl bromide alternatives research in forest tree nurseries. In: Proceedings of the Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions. 33: 1-4.*
- *Mallams, K.M., Starkey, T. 2012. Brown spot needle blight. In: Cram, M.M, Frank, M.S., Mallams, K.M., Tech. Coords. Forest nursery pests, Agriculture Handbook 680. Washington, DC: USDA Forest Service: 13-15.*

- *Starkey, T., Enebak, S.A. 2012. Rhizoctonia Blight of Southern Pines. In: Cram, M.M, Frank, M.S., Mallams, K.M., Tech. Coords. Forest nursery pests, Agriculture Handbook 680. Washington, DC: USDA Forest Service: 63-65.*
- *Starkey, T.E, Enebak, S.A., South, D.B. and Cross, R.E. 2012. Particle size and composition of polymer root gels affect loblolly pine seedling survival. Native Plants Journal. 13:19-26.*
- *Starkey, T.E. and S.A. Enebak. 2011. The use of Proline® (prothioconazole) to control pitch canker, Rhizoctonia foliage blight and fusiform rust in forest tree nurseries and efforts to acquire registration. In: Riley, L. E.; Haase, D. L.; Pinto, J. R., tech. coords. National Proceedings: Forest and Conservation Nursery Associations - 2010. Proc. RMRS-P-65. Fort Collins, CO: USDA Forest Service, Rocky Mountain Research Station. p. 49-57*
- *Starkey, T. 2012. Yellows, or chlorosis. In: Cram, M.M, Frank, M.S., Mallams, K.M., Tech. Coords. Forest nursery pests, Agriculture Handbook 680. Washington, DC: USDA Forest Service: 138-139.*

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)

- *Accomplishments: A two year grant proposal was submitted and approved by the USFS to evaluate the use of herbicides for the propagation and establishment of herbaceous plants indigenous to the ground-layer community of the longleaf pine ecosystem. This \$80,000 will be used pay a portion of Barry Brooks salary and to bring on a MS student in May 2013.*

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.

- *Accomplishments: The Southern Forest Nursery Cooperative and the Forest Health Cooperative, both operated at Auburn University, jointly applied for membership within the Center for Advanced Forestry Systems (CAFS). Membership will allow a broader exposure of our research to others in the forest industry arena to solve complex, region-wide forest issues. There is the potential of \$60,000 that will be used to direct Nursery Cooperative and Forest Health Cooperative research.*
- *Accomplishments: Nursery Cooperative personnel attended the joint 2012 Southern Forest Insect and the Southwide Forest Disease Workshops annual meeting in Charlottesville, VA.*

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2013 WORK PLAN

As Approved by the Southern Forest Nursery Management
Cooperative Advisory Committee
November 14-15, 2012

AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2012 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

A fumigation trial testing a combination of soil fumigants as a methyl bromide alternative will be conducted at in a member nursery. Depending upon the nursery, either spring fumigation or fall fumigation will be used. The study will use high barrier plastics and reduced fumigant rates to comply with the new soil fumigation rules on the production of seedlings, weed, nematode control and *Trichoderma* spp levels. We anticipate that 3 nurseries will establish a trial with TE-3. Two of the nurseries would be the Shellman nursery in Georgia and the Selma nursery in Alabama. A third location will be the Courtland, VA nursery. This will be the first of two trials at this nursery in preparation for the Southern Forest Nursery Conference in Williamsburg, VA in the summer of 2014. These TE-3 studies will be monitored for weed activity and seedling quality.
(Starkey/Enebak)

Herbicide Trials

A number of herbicide trials will be installed to examine the effects of herbicides on specific weed pests and seedling quality.

- A herbicide trial will be conducted at the East TN nursery at Delano, TN and in the greenhouse at Auburn targeting morning glory in nursery beds. The chemical to be tested is Raptor/Clearcast (ammonium salt of imazamox). This chemical was recommended by a manager from Maryland who attended the 2012 nursery meeting. (Whitaker/Brooks/Conn)
- In order to determine survivability of galled seedlings produced from PAC trials in 2012, we will outplant galled seedlings in irrigated and non-irrigated lands during December 2012. (Whitaker/Brooks)
- A nursery manager has requested that we determine at what point in the growing season the application of PAC no longer produces galled seedlings. (Whitaker/Brooks)
- An operational herbicide trial testing pre-emergent herbicide applications of Goal, Pendulum Aquacap + Goal, and Ronstar + Pendulum Aquacap + Goal will be installed simultaneously with a soil stabilizer to test the efficacy of weed control on annual sedge in one nursery.

(Whitaker/Brooks)

- A herbicide trial testing different pre-emergent combinations at varying rates of the three herbicides Ronstar, Pendulum Aquacap, and Goal will be installed in multiple nurseries to examine the efficacy of tank mixes on annual sedge over different soil types.
(Whitaker/Brooks)

Fusiform Rust Control

Due to personnel changes at the US Forest Service Rust Screening Center we will not conduct a fungicide study this year. The US Forest Service has just begun the process of hiring a replacement for Josh Bronson and it is unlikely that a permanent replacement will be on site before early summer. (Starkey/ Enebak)

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

Plant Growth Regulators

A nursery study will be established using the growth regulators (cyclohexaketone (Augeo), paclobutrazol (Bonzei), benzyladenine (BAP-10), and flurprimidol (Topflor)) that showed a response in 2012 on container Eucalyptus. (Starkey/Keever (Horticulture)/ Enebak)

Eucalyptus Planting Depth

As a result of inconsistent outplanting survival and conflicting literature reports, a planting depth study was requested by a member that will be initiated using Auburn University Stress Facility, and Trophatron and field planting site study. The SFNMC will work with the scientists at NC State (Jose Stape) and their Eucalyptus research program to coordinate trials. (Starkey/Enebak)

Root Electrolyte Leakage

Root electrolyte leakage (REL) is a relatively rapid test that has been used to verify freeze injury. It has been reported to be more accurate than root growth potential in spruce and larch. A study will be established determine if REL can be used to detect other forms of root injury such as may occur with seedling lifting. (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.

Longleaf Pine Understory Plant Propagation and Establishment

The Nursery Cooperative was approached by the Forest Service to determine new and operational techniques for the propagation and establishment of longleaf pine understory plant species using herbicides. The following trials will be conducted but will not use Nursery Cooperative Funds. (Enebak/Brooks)

- Herbicide tolerance trials using different wiregrass sources are proposed to be done at Auburn University in the Nursery Cooperative's seedling stress facility and in the field.
- Herbicide tolerance trials using a range of longleaf pine understory plant species are proposed to be done at the Claridge Nursery in Goldsboro, NC. Other trials at the nursery will involve seed handling and outplanting techniques.

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

Determination of Soil Water Retention Curve

Soil water retention curves can help nursery managers who wish to use tensiometers make decisions about irrigating their crop more objectively. This study will be continued a second year modifying our methodology for 2012 for simulating field soil bulk density in the greenhouse. Study Dates: Jan 2013 – Nov 2013. (Starkey/Enebak)

Tap Root Development in Longleaf Pine.

Historical records have shown that when toppling occurs in longleaf pine stands as a result of hurricanes, a large percentage of trees examined were container grown and did not have a taproot. A preliminary study at Auburn several years ago showed that once air pruning of the taproot occurred a percentage of these container trees never formed a taproot. Last year a container nursery put in a small field study in which the root callus on the tap root was removed in an effort to initiate tap root development. This study will combine these two previous studies and include root stimulating hormones such as IBA. This is a nursery requested study. (Starkey/Enebak)

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 new soil fumigation rules that will be released in spring 2013. (Starkey/Enebak)

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

In collaboration with our US Forest Service partners and with input from Nursery Cooperative membership, Dr. McNabb will complete the Hardwood Manual editing with a final publication date of Summer 2013 (McNabb/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/Whitaker)

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 2 day program to be held in the Henderson, NC region in mid-July, 2013. Trips could include the Cradle of Forestry, the USFS Rust Screening Laboratory, the NC Arboretum and tour the VanWingerden Greenhouse in Mills River,

NC. The agenda will cover presentations by Nursery Cooperative staff on current activities and results. (Enebak/Bowersock)

Research Reports (Staff)

We plan on producing Research Reports and Technical Notes in FY13.

Newsletters

Newsletter distribution will be planned for March and September 2013. 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/Whitaker/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 2012 to 2013 planting season. The survey will be sent out in June 2013. (Enebak/Bowersock)

Short Course

The Nursery Cooperative will conduct a short course in Auburn for nursery personnel based on nursery requests. This will be in September 2013. (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 FY14 Advisory Committee Meeting will be held on November 12-13, 2013. 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)

Pesticide Label Restrictions

If possible, the Nursery Cooperative staff will continue to investigate the possibility of restricting new pesticide labels to Nursery Cooperative members. (Enebak/Starkey/Whitaker)

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.