AUBURN UNIVERSITY
SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2008 ACCOMPLISHMENTS

As presented to the Nursery Cooperative Advisory Committee
November 6-7, 2008

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SOUTHERN FOREST NURSERY MANAGEMENT COOPERATIVE

FY 2008 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 Studies for MBr Alternatives are proposed.

Large scale alternative MBr trials utilizing large plots will be established at two new nurseries under the USDA Areawide project. Currently, these would include both a fall and spring fumigation in South Carolina. These are the South Carolina Forestry Commission's nursery in Trenton, SC (fall) and the ArborGen nursery in Blenheim, SC (spring). Fumigants that will be considered are MBr, MBC 70/30, Pi Chlor 60, Chloropicrin, Pic+, Pic++ (new formulation) and DMDS and will examine their effectiveness on targeting/controlling nutsedge. In addition to two new fumigation trials, second year seedling data will be collected from Glennville and Jesup, GA. These trials were part of the first year USDA Areawide project and were part of the nursery tour for the 2007 Contact Meeting. (Quicke/Starkey/Enebak)

- ***Accomplishments: Two new, large-scale demonstration trials were installed at the Blenheim (5 acres) and Trenton (5 acres) nurseries in SC. Treatments at Trenton & Blenheim are MBr 400lbs/a, MBr 235lbs/a, MBC 70/30, Pic+, DMDS, Chloropicrin, and Pic Chlor 60. In addition, seedling data and soil borne fungi data was collected from the second season MBr Alternative Trials in Glennville and Jesup, GA. Information collected from these four trials was presented at the Contact Meeting and the Methyl Bromide Alternative Meeting in Orlando, FL.***

Nematode Control over Pine Crops

A third trial will be put in to examine compounds that will control nematodes when applied over the top of pine on second year land. Compounds and rates to be tested will be determined by results of first trial. (Starkey/South)

- ***Accomplishments: A study was installed at the Glennville Regeneration Center in Glennville, GA using a modified nursery lateral root pruner injection system.***

Treatments included 4 rates of 1,3-Dichloropropene and DMDS. Information will be put into a Research Report.

Herbicide Trials

Herbicide trials testing the tolerance of seedlings to directed applications of pelargonic acid, acetic acid, phosphoric acid (and possibly clove oil) will be established at three nurseries on loblolly and slash pine. (South/Hill)

- ***Accomplishments: Three directed application studies were established using pelargonic acid, acetic acid, phosphoric acid, and sulfuric acid (Camden, AL; Trenton, SC; Byromville, GA). No injury was detected at any nursery but weed control on spurge in AL was minimal. Seedlings from these trials will not be measured.***

Establish a study on prostrate spurge using pendimethalin at two nurseries. (South/ Hill)
Establish a multiple application study using metsulfuron-methyl at one nursery. (South/Hill)

- ***Accomplishments: Four directed studies were established using multiple applications of pendimethalin and metsulfuron-methyl (Camden, AL; Trenton, SC; Jessup, GA; Elberta, AL)***

Establish a greenhouse study on water quality and pelargonic acid (South/Starkey/Hill)

- ***Accomplishments: Study not established. Due to excellent control of spurge by pendimethalin, emphasis on spurge control has shifted away from postemergence control with acid to preemergence control with pendimethalin. Two nutsedge trials were installed using imazosulfuron and rimsulfuron (Delano, TN; Trenton, SC).***

Fusiform Rust Control

In response to the soybean rust appearing in the southern United States, many new compounds are developed and released by chemical companies. Thus, further studies will be conducted to examine the efficacy of soybean rust inhibiting fungicides for the control of fusiform rust. Some of the compounds that need to be tested include Charter®, Proline®, Compass®, Bravo® and Headline®. Two or more rates will be used to test both seed treatment and foliar application. These will both be tried in the greenhouse under the inoculation regimes of the USDA Rust Screening Laboratory using both loblolly and slash pine. A nursery study of the most promising compounds will also be put in at two nursery sites on loblolly pine. These include the SC Forestry Commission's nursery at Trenton and the ArborGen nursery in Shellman, GA. (Starkey/Enebak)

- ***Accomplishments: Bayleton®, Proline®, and Provost® were tested this year as either a seed treatment or foliar spray on loblolly and slash pine seedlings. Fungicide-treated***

seedlings were taken to the USDA Forest Service Rust Screening Laboratory in Asheville, NC for inoculation and evaluation. Final data will be put into a Research Report.

Rhizoctonia Foliage Blight

A study to examine the effectiveness of fungicides (Proline®, Provost®, Heritage®) and application methods for the control of *Rhizoctonia* foliage blight infection of loblolly pine will be installed at one location. (Starkey/Enebak)

- ***Accomplishments: A study evaluating Proline® and Heritage® for the control of Rhizoctonia foliage blight on loblolly was put in at the Pearl River nursery. Final data will be collected in December 2008, put into a Research Report and used for Section 18 requests for Mississippi.***

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

Biological/Fungicide Treatment for *Phytophthora spp.*

Several fungicides that act as elicitors and biologicals will be tested against the root and foliage pathogen *Phytophthora spp* at the Linville Nursery in North Carolina. Some of the compounds to be examined are Alude®, Aliette®, Subdue MAXX®, SC-27® and RootShield®. This study will look at seedling quality and disease prevention in the nursery. Data and trials will be part of the 2008 Southern Forest Nursery Association Meeting to be held in Asheville, North Carolina. (Enebak/Starkey)

- ***Accomplishments: Three studies with project proposals, designs and materials were sent to the Linville, NC nursery. The studies were: 1) Elicitors and biologicals to control the root and foliage pathogen Phytophthora spp. 2) Vole control in nursery beds and 3) capping material for germination on Frasier Fir in the greenhouse. The first two studies were not put in due to the shift from bareroot to container. The capping study was put in and was available for evaluation at the Southern Forest Nursery Association Meeting in Asheville, North Carolina.***

Biologicals and Seedling Quality

An increasing number of contacts have been made to member nurseries asking that their products be tested in the nursery. This will be a 2-phase study. First, we will look at the biologicals in the greenhouse on loblolly and longleaf under a standard fertilization regime.

Those biologicals that show significant differences in seeding quality will be further tested in the next study at a nursery. The biologicals to be tested include SC-27®, Inocuaid®, Alexin Plus®, Biostart Defensor® and Biostart Rhizoboost®. (Starkey/Enebak)

- ***Accomplishments: The first phase of this study was done testing SC-27®, Inocuaid® and Hydra Hume® on loblolly pine in the greenhouse. The results of this data will be put into a Research Report and will determine the research direction for next year.***

Gypsum Effect on Pine

The addition of gypsum to nursery beds is a common practice, however, there is an unknown relationship between chlorotic pine seedlings, drought and gypsum levels. This study will look at increasing rates of gypsum in the greenhouse on the development of roots of loblolly and longleaf pine. The results of this first study will direct future studies in this area. (Starkey/South)

- ***Accomplishments: No progress was made on this project.***

Pitch canker (*Fusarium circinatum*) control on conifer seed

A series of laboratory rate studies will be conducted to identify fungicides and biologicals that may have activity against the pitch canker fungus *Fusarium circinatum.* Initial compounds to be tested are Bayleton®, Provost®, Proline® and several other biologicals or elicitors (Alexin Plus®) known to have activity against other *Fusarium* spp. genera. These will be tested in vitro on agar media for initial fungicidal activity. Promising compounds will then be tested in the field on pine seed. (Starkey/Enebak)

- ***Accomplishments: A greenhouse experiment that examined the efficacy of Proline® on the control of pitch canker on longleaf seed and seedlings was installed. Data will be put into a Research Report used for Section 18 requests for GA, SC and AL.***

Seed Vigor and Germination

A series of studies will be started that examine the influence of humic acid/fulvic acid on loblolly and longleaf pine. The first study will examine if humic acid/fulvic acid increases seed vigor and total germination. Priority 2 Project. (Starkey/Hill)

- ***Accomplishments: No progress was made on this project.***

Summer Chlorosis

This study will examine the role of humic acid/fulvic acid in controlling summer chlorosis loblolly pine. The impact of these chemicals in combination with iron and sulfur will be studied. Priority 2 Project. (Starkey/Hill)

- ***Accomplishments: No progress was made on this project.***

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.

Seed Treatments

An experiment to test alternatives (clay, Flight-Control®, etc.) to thiram as a bird repellant on pine seed germination will continue to be examined. (Starkey)

- ***Accomplishments: Both bird seed and tree seed (pine and hardwood) were treated with various bird repellants on the Auburn University campus and seed predation measured. Data will be put into a Research Report.***

Response of Loblolly Pine to Cold Weather De-acclimation

A study will examine the response of loblolly pine seedlings to warm temperatures following cold weather acclimation at two nurseries. A seedlot susceptible to freeze damage will be used. Assuming approval of an external grant, this study will also address whether it is possible to predict cold acclimation using genetic markers. Coop Funds will not be used on this project. (Starkey/South/Enebak)

- ***Accomplishments: Seedlings were sampled periodically from a container nursery in Alabama and from bareroot nurseries in North Carolina and Virginia to look for genetic markers for cold weather de-acclimation. Results will be reported in a Research Report.***

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

Tap Root Development in Container Longleaf and Loblolly Pine

The development of air-pruned container longleaf and loblolly tap root morphology with respect to age will be examined. This study was initiated in May 2008 and continued for 12 months to test the hypothesis that air-pruned tap roots of longleaf and loblolly pine will continue to grow normally. (Starkey/South)

- ***Accomplishments: This study was installed in late April 2008 and was 6 months into its 12 month run when it was destroyed during the pre- and/or post-game activities of the LSU / Auburn football game. It was estimated $28,000 was lost due to the vandalism, however, Auburn "estimated" the loss as the cost of the seedlings = $45.***

Seedling Quality Studies

Measure and collect tree characteristics from 3 seedling quality studies established in Georgia Alabama and South Carolina. (South/Hill)

- ***Accomplishments: Seedlings were measured for two studies in Georgia and one study in Alabama. Data will be prepared and published in a Journal Article.***

Seedling Survival/Outplanting/Genetics

A PhD level student will be identified and will begin work examining the relationship between genetics, storage ability and seedling outplanting survival on southern pine species of interest that may include shortleaf, slash, longleaf and loblolly pine. (South/Enebak/Starkey)

- ***Accomplishments: Paul Jackson started as a PhD student and is examining the effects of Pythium spp. and cold storage and seedling survival. Data collected to date includes root growth potential (RGP), inoculation with Pythium spp. and longleaf survival, inoculation cold storage survival and media type.***

Seedling Counting/Measuring

Researchers at AU's Biosystem Engineering Department will continue to develop a system to count and measure seedlings while be lifted from the beds. Nursery Cooperative Funds will not be used on this project. (McDonald/Hunt/Enebak)

- ***Accomplishments: No progress was made on this project.***

GOAL B: TECHNOLOGY TRANSFER

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

Methyl bromide

The Coop staff will continue to keep abreast of activities related to the Critical Use Exemption, specifically the allocation process. We will inform the membership of any EPA initiatives and continue to work with the AF&PA, the Crop Protection Council and USDA to provide input and influence the CUE process if necessary.

- ***Accomplishments: The Critical Use Exemption for the 2010 growing season was submitted to the EPA for State Department and United Nations approval on July 14, 2008. The CUE MBr allotment for Forest Tree Nurseries will be determined in early November by the Parties of the Montreal Protocol. We will continue to file a CUE on behalf of Forest Tree Nurseries as long as the EPA and the State Department participate in the CUE process.***

The Coop staff will continue to work with the AF&PA, and USDA to inform and influence the EPA deliberations regarding pesticide regulation. We will provide information to the EPA when needed to strengthen the case of intrastate seedling shipment qualification for QPS fumigation. Those states that have yet to finish the process (TN and VA) will be addressed. We will work with both TN and VA to strengthen regulatory language supporting the use of methyl bromide for the production of healthy seedlings under the Quarantine and Phytosanitary exemption.

- ***Accomplishments: The Nursery Cooperative continued to make contacts with VA and TN and both forestry commissions are optimistic that legislation to obtain QPS language will be presented.***

In collaboration with MBr manufacturers and applicators, the Coop staff will continue to keep abreast of EPA actions and/or possible legislative initiatives that may affect the future availability of MBr. We will continue to inform the membership through the Advisory Committee to keep the membership knowledgeable of these activities. (Starkey/Enebak)

- ***Accomplishments: Under the heading of Risk Mitigation, Nursery Cooperative Staff supplied documents, data, and comments to numerous governmental organizations concerning soil fumigants and the re-registration of MBr and Chloropicrin for the production of forest-tree seedlings. Contacts included the National Association of Land Owners, National Association of State Departments of Agriculture, Society of American Foresters, Association of Consulting Foresters, National Council for Air & Stream Improvement, American Forest and Paper Association, Forest Landowners Association, 11 State Farm Bureaus and 11 Forestry Commissions of Cooperative Member states, Oregon, Washington, Kentucky and Maryland Forestry Commissions,***

Alabama & Georgia Legislative Aides, Alabama and Georgia Department of Agriculture, US Forest Service, Chloropicrin Manufacturers Taskforce, Methyl Bromide Users Group, Minor Crop Association, and 6 letters directly to EPA (Edwards, Bradbury, Carone, Weiss, Leahy).

Write Review Paper on the effect of genotype on seedling survival after outplanting (South/Beineke)

- ***Accomplishments: No progress was made on this project.***

Continue with the "Crop Profile" for Southern Bareroot Pine & Hardwood Nurseries

Working with the US Forest Service we will continue the process of developing a hardwood production technique manual. This includes finalizing the survey data collected by Ken McNabb, selecting an editorial panel, and starting the process of identifying authors for their input. (Lowenstein/Enebak)

- ***Accomplishments: Dr. Lowenstein has made no progress on this task.***

Re-registration of Nursery Pesticides

The Cooperative staff will continue to follow the re-registration process for pesticides used in seedling production and provide information to the EPA when necessary. (Enebak/South/Starkey)

- ***Accomplishments: One major re-registration issue is MBr and Chloropicrin and Risk Mitigation. We have also prepared a new label for Proline® to include pine seed and seedlings for the control of fusiform rust, pitch canker and Rhizoctonia spp. Bayer CropScience is awaiting 2008 field and greenhouse data. The Nursery Cooperative will request a Section 18 for pitch canker control in AL, GA and SC and Rhizoctonia foliage blight in MS.***

Maintain and Update Nursery Cooperative Web Site

The Cooperative staff will continue to update the Nursery Cooperative web site for use by Cooperative Members. (Bowersock)

- ***Accomplishments: Elizabeth continues to update the Nursery Cooperative web site with recently completed Research Reports, Technical Notes and Nursery Cooperative Presentations shown at Contact Meetings and the Nursery Short Course.***

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 half day program in 2008 to be held in Asheville, North Carolina the week of July 21, 2008. The agenda will cover presentations by Cooperative staff on current activities and results and include a field trip to the Linville Nursery run by the NC Division of Forestry. (Enebak/Bowersock)

- ***Accomplishments: The 2008 Contact Meeting was held in conjunction with the biennial Southern Forest Nursery Association Meeting in Asheville, NC on July 21, 2008. The meeting had 54 Nursery Cooperative attendees who were brought up-to-date on seedling production issues that included freeze damage & protection, cold storage, the effects of gels on seedling survival, nematode control experiments, some new herbicides, MBr alternatives and Risk Mitigation rules.***

Research Reports (Staff)

- ***Accomplishments: The following Technical Notes and Research Reports were published and distributed to Nursery Cooperative Members.***

Topic	Published As	Author
Seedling Production Survey	TN-08-01	Enebak
Flumioxazin and Prodiamine Herbicides	RR-08-01	South
Temperatures and Freeze tolerance	RR-08-02	South et al
Sulfonylurea Herbicides	RR-08-03	South & Hill
Fusiform Rust Fungicides	RR-08-04	Starkey & Enebak
Spurge and Seedling Growth	RR-08-05	South & Hill
Gels and Seedling Growth/Survival	RR-08-06	Starkey
Two Year Fumigation Trials – Texas	RR-08-07	Starkey & Enebak

Newsletters

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

- ***Accomplishments: A Spring 2008 and Fall 2008 Newsletter was sent to all Nursery Cooperative Members, approximately 80 on the mailing list. Topics included:***

Nursery Production Survey 2006-2007
Risk Mitigation Rules
Bayleton Label Updated
MBr and QPS Rules
MBr Alternative Trials
Soil Moist® and Zeba® Update
Leadership Development
Water and Pesticide Efficacy
Fusiform Rust Control – A New Fungicide?
Cold Storage and Pythium spp
Nematode Control Over the Top of Seedlings
Pitch Canker Control Trials
Freeze Injury & Cold Tolerance

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 and cases arise. (Staff)

- ***Accomplishments:***

	Starkey	Quicke	Hill	South	Enebak
Phone calls	**125**	**12**	**24**	**48**	**57**
Letters	**23**			**7**	**12**
Emails	**238**	**10**	**6**	**94**	**145**
Site Visits	**24**	**12**	**10**	**6**	**4**
Diagnosis	**23**		**2**	**11**	**12**

Production Survey

The Nursery Cooperative staff will repeat the seedling production survey initiated in FY 03. The same questionnaire will be used to obtain production figures for the 2007 to 2008 planting season. Attempts will be made to increase the contacted nurseries for seedling production data. The survey will be sent out in late spring/early summer 2008. (Enebak/Bowersock)

- ***Accomplishments: An updated mailing list that included 238 Nurseries (up from 102 in previous surveys) was mailed in June 2008 throughout the southern US to gauge seedling production for the 2007-2008 planting season. Data was compiled and put into Technical Note 08-01 which was mailed to all participating nurseries.***

Short Courses

The Nursery Coop will conduct a Nursery Production Short Course in August/September 2008. (Staff)

- ***Accomplishments: A Forest Nursery Management Short Course was held in Auburn from September 2-4, 2008. Originally scheduled for 3 days, the Short Course was compressed into 2 long days/nights to avoid Hurricanes Gustav/Rita/Ike that were all churning in the Atlantic and Gulf of Mexico. Nevertheless, 30 Nursery Cooperative Members braved the blustery winds in Auburn to hear about irrigation, soil/plant/water relationships, insect, disease and weed control, fumigation and sampling procedures. Participants received 21 CFE's Category 1 and 6 Pesticide Re-certification credits.***

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 FY09 Advisory Committee Meeting will be held November 5-6, 2008. Two, half-day meetings 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: Advisory Meeting held on November 6-7, 2008 in Auburn.***

Coop Membership

The Coop staff should make an effort to recruit new members among those nurseries that are significantly benefited from the pesticide labeling activities of the Coop. State nurseries in Florida and Kentucky were mentioned as possible new members. (Staff)

- ***Accomplishments: Formal contacts were made with Kentucky and CellFor for Nursery Cooperative Membership. CellFor joined the Nursery Cooperative as an Associate Member for the FY 2009 year. Chris Rosier will serve as the Contact person for CellFor.***

Pesticide Label Restrictions

If possible, the Coop staff will continue to investigate the possibility of restricting new pesticide labels to Coop members. This might be done using the 24C process that restricts chemical use to specific counties within states. (Enebak/South/Starkey)

- ***Accomplishments: Tom Starkey continues to work with Bayer CropScience representatives about possible labeling for perspective Bayleton® replacement. Bayer CropScience has received an example label from the Nursery Cooperative for pine seed and seedlings.***

Update the Coop Membership and Nursery Directories

An on-going activity. (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

Coop 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 gave 12 presentations and published 8 articles on the subject of Forest Tree Nursery Management.***

    - Jackson, D.P.; Barnett, J.P. Germination of longleaf pine (*Pinus palustris*) seed treated with Thiram and oleoresin capsicum. Southwide Forest Disease Workshop, January 15-17, Savannah, GA
    - Jackson, D.P.; Enebak, S.; South, D. 2008. Does *Pythium* species reduce the quality and survival of southern pine seedlings after cold storage? Graduate Student Council's 18th Graduate Student Research Forum, March 10-12, Auburn University
    - Jackson, D.P., Enebak, S.A. and South, D.S. 2008. Relating seedling quality and survival to cold storage of southern pine seedlings in the presence of *Pythium*. Auburn University Southern Forest Nursery Management Cooperative Contact Meeting. July 21, 2008, Asheville, NC

- Jackson, D.P. 2008. The effect of *Pythium* and cold storage on the root growth potential and root collar diameter or longleaf pine (*Pinus palustris*) seedlings. Southern Nursery Association Research Conference, August 6-7, Atlanta, GA
- Jackson, D.P.; Enebak, S.; South, D. 2008. Does *Pythium* species reduce the quality and survival of southern pine seedlings after cold storage? Biological and Environmental Summer Research Symposium, August 8, Auburn University
- Starkey, T. A. 2007. Applied Nursery Researcher Why Did My Seedlings Die? International Forest Company meeting on Intensive Forest Management. September 20, 2007
- Starkey, T.A. 2007. Area-wide Demonstration of Methyl Bromide Alternatives in the Production of Loblolly Pine Seedlings in the Southern United States. Environmental Protection Agency Site Visit. Glennville, GA October 9, 2007
- Starkey, T.A. Guest lecturer – Forest Physiology Auburn University. November 29, 2007
- Starkey, T.A. and S.A. Enebak 2008. Evaluation of fungicides for the control of fusiform rust (*Cronartium quercum f.sp. fusiforme*) on loblolly pine seedlings. Southwide Forest Disease Workshop. January 2008. Savannah, GA.
- Starkey, T.A. 2008. Shank injection treatments for the nematode control in loblolly pine beds. Southwide Forest Disease Workshop. January 2008. Savannah, GA.
- Starkey, T.A. 2008 Southern Forest Nursery Meeting July 22-24, 2008 Asheville, NC
- Starkey, T.A. 2008. Why did my seedlings die & Update on MBr regulations? Arborgen Annual Meeting August 12, 2008 Asheville, NC

Publications

Coop staff are encouraged to publish research results in scientific journals. (Staff)

- ***Accomplishments:***

  - Jackson, D.P., S. Enebak, D. South, C. Gilliam, and D.J. Eakes. 2008. The effect of *Pythium* and cold storage on the root growth potential and root collar diameter of longleaf pine (*Pinus palustris*) seedlings. Proc. Southern Nursery Association Research Conference. 53: 30-34.
  - McNabb, K. and Enebak, S.A. 2008. Forest tree seedling production in the southern United States: The 2005-2006 planting season. Tree Planters' Notes.
  - Starkey, T.E. & D. B South 2008. Root Dip Treatments Affect Fungal Growth *in vitro* and Survival of Loblolly Pine (*Pinus taeda*). Tree Planters Notes *(In press).*
  - Starkey, T.E. & D. B South 2008. From Lifting to Planting: Root Dip Treatments Affects Survival of Loblolly Pine (*Pinus taeda*), Southern Forest Nursery Association proceedings.
  - South, D.B. 2008. 14 Reasons Why Bareroot Loblolly Pine Seedlings Die. Forest Landowner Vol. 67:19-21.
  - South, D. B. and William A. Carey. 2009. Use of pesticides in bareroot hardwood seedbeds in the southern United States Tree Planters Notes *(In press).*
  - South, D.B. 2009. A century of progress in weed control in hardwood seedbeds. Forest and Conservation Nursery Conference proceedings USFS Gen. Tech. Rep. *(In*

press).

- VanderSchaaf, C.L. and D.B. South. 2008. RCDlob: a growth and yield model for loblolly pine that incorporates root-collar diameter at time-of-planting. The Americas Journal of Plant Science and Biotechnology 2:5-11.