Southern Forest
Nursery Management Cooperative
Fall 2011

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Director's Report

It has been a few months since our last Newsletter and I hope that your seedlings are getting ready to be lifted and that you have had another productive growing season under your belt. There have been no changes in the soil fumigant rules since the Spring Newsletter and the Contact Meeting in June, thus we are still on schedule for a complete adoption of the reregistration decisions (REDs) to come under enforcement sometime in 2012. It is possible that the rules and new labels will be in effect for Spring 2012, but because of delays with some of the requirements, I am leaning toward full implementation for all soil fumigant rules in the Fall 2012.

Membership

Tom and I have been approached by a couple of nurseries in the southern U.S. about joining the Nursery Cooperative. Most recently we visited with the Northeast Forest Association and presented Nursery Cooperative membership to the Kentucky forest-tree nursery. We also shared with them our brochure and answered a few questions concerning the Cooperative. Current membership within the Nursery Cooperative is 17 Full members and 1 Associate Member.

Advisory Meeting

The Advisory meeting is scheduled for Wednesday and Thursday, November 9 & 10, 2011 at the School of Forestry and Wildlife Sciences Building at 602 Duncan Drive. This is one week later than our usual time and was moved to allow us to attend the Methyl Bromide Alternatives Conference and present the latest soil fumigation information in San Diego, CA. The Nursery Cooperative Staff will begin the process of updating our Accomplishments, the Budget and next year's Work Plan. If you have any ideas or items that your organization would like addressed, please let me, Tom, or Paul know. The Advisory meeting will begin after lunch on Wednesday and adjourn around noon on Thursday. We will set up the meeting using video conferencing for those who may not be able to travel to Auburn. If you would like to get access to the meeting, please call Elizabeth Bowersock at 334.844.1012 and she will let you know what you need to access the meeting. Place those days on your calendar and more information will be available shortly.

Contact Meeting

The 2011 Nursery Cooperative Contact meeting was held June 27-30, 2011 in Augusta, Georgia and was attended by 37 Nursery Cooperative members. Invited speakers included Vic Vankus of the National Seed Laboratory, Chad Hutchinson of TriEst Ag Group, Chip Bates of the Georgia Forestry Commission and Becky Barlow and Lori Eckhardt from the School of Forestry & Wildlife Sciences at Auburn University. For those who were unable to attend, we have posted all the presentations on the Nursery Cooperative's website for you to access. If you are unable to access or have any questions about the

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presentations, please do not hesitate to contact one of us at Auburn. Next year's Contact Meeting will be held in Chattanooga, TN on July 16, 2012 in conjunction with the Biennial Southern Forest Nursery Association Conference which will be held July 17-19, 2012. As is the normal practice, we will have an indoor session of Nursery Cooperative staff presenting their most recent data on Monday afternoon of the 16th and then the rest of the week will be the SNFA meeting. More details will be forthcoming with the Spring 2012 Newsletter.

A Note from Dr. James Shepard, SFWS Dean

This year marks 34 years of collaboration between our School, the forest nursery industry, and state organizations. The Nursery Coop is unique in the United States and its members account for an astonishingly high fraction of all the pine seedlings produced in the country each year. Nursery seedlings are an indispensable segment of the plantation production cycle and the means to introduce advanced genotypes into production. I will be unable to meet with you at the Advisory Meeting in Auburn this November but look forward to future meetings. I see the Southern Forest Nursery Management Coop as one of our school's unique strengths and am proud to continue supporting it. -- Dr. James Shepard

Pesticide News

The Critical Use Exemption (CUE) Rejection

Unlike previous years, with EPA rejecting the Forest Seedlings 2010 CUE application last year, there was no need to apply for a CUE this year. When we began the application process in June we discovered EPA's decision to deny our 2010 application for MBr use in 2013. We were caught totally off-guard. No prior notification was made to any of the 7 Forest Seedling applications and EPA's official response to their rejection of the Forest Nursery applications 7 months later was:

"The U.S. did not put forward any of the forest seedling CUE requests for use in 2013 because our assessment indicated that there were technical and economic feasible alternatives. We looked at alternatives such as the 3-Way Mixture (1,3-D plus chloropicrin plus metam sodium), 1,3-D plus chloropicrin, and iodomethane plus chloropicrin. In addition, DMDS (Paladin) will be available starting in 2011 and provide an additional technically and economically feasible option. Methyl bromide will still be available as a quarantine treatment in many states."

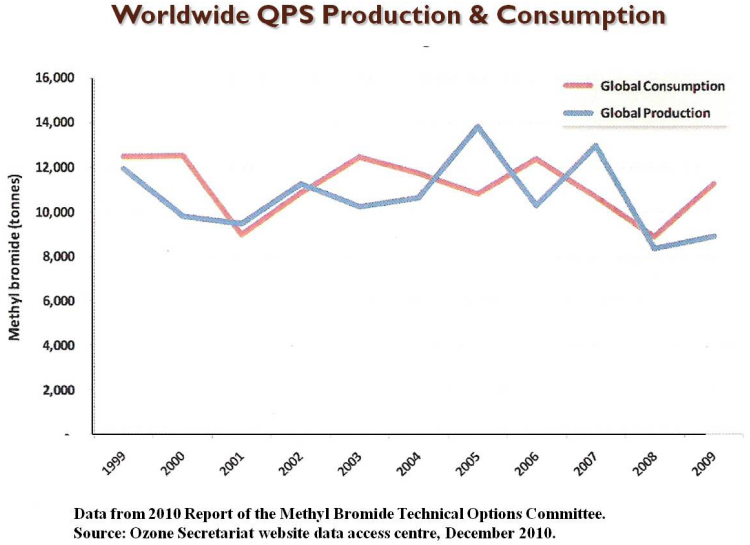
The 2010 rejection of the CUE applications from all Forest Seedling applications by EPA means: 1) that they will not consider any new CUE applications from the Forest Nursery Sector unless it is accompanied by 5-yrs of research data showing that an alternative soil fumigant does not work, 2) those nurseries without state QPS rules can use MBr in 2011 and 2012 and 3) unless a particular nursery is located in a state with appropriate QPS rules, MBr cannot be used after 2012.

I believe that quarantine pre-shipment (QPS) use will now come under even more scrutiny than before by EPA, the State Department and the Parties of the Montreal Protocol. Despite my concerns, I've been told by USDA APHIS that the ending of the CUE program by EPA for the Forest Seedling Sector will not affect the availability of MBr under the Quarantine Pre-Shipment (QPS), thus those members in States with Plant Protection language should still be allowed to use MBr. This is clearly stated by EPA in their last sentence of their explanation for the CUE denial copied above. However, there has been some concern from MeBTOC about the increased use of QPS. Some ECU (European Currency Unit) countries are claiming our state quarantine permits for methyl bromide use are violating the Montreal Protocol so I envision that QPS MBr will continue to be an issue in the future.

The QPS Process

This is the first year in my 7 years as Nursery Cooperative Director that I have not been asked about QPS from either EPA, USDA, MeBTOC or APHIS. The silence is disturbing. For those of you that have/had young children around the house, silence usually means that something is up. There has been some concern from MBr applicators that EPA is using the new soil fumigation REDs to stop the use of MBr. Discussions with both APHIS and others (non-rule

Figure 1. Worldwide use of methyl bromide classified as Quarantine and Pre-shipment use: 1999 – 2009. Graph from page 219 of the 2010 Montreal Protocol on Substances that deplete the ozone layer, UNEP Report of the MBr Technical Options Committee, 398 pp.



Data from 2010 Report of the Methyl Bromide Technical Options Committee.
Source: Ozone Secretariat website data access centre, December 2010.

makers) within EPA have indicated that the new soil REDs are not going to do away with MBr QPS. According to USDA officials, QPS usage is now outpacing "critical use" usage, and QPS usage of methyl bromide in general is coming under scrutiny of the Methyl Bromide Technical Options Committee (MeBTOC). Figure 1 is a graph that shows production and consumption of MBr classified as QPS use.

In 1999, there was approximately 12,500 metric tons of QPS MBr consumed. Over the next 10 years the amount consumed only decreased slightly to 11,000 metric tons. There is no doubt that QPS usage is outpacing CUE usage since 2000 as CUE is being cut at a rate of 10-20% every year, (see Fall 2008 Newsletter) but to suggest that MBr is being misused or outpacing CUE use under the QPS program is disingenuous as it has been nearly constant.

While the official EPA response to the Forest Seedling CUE rejection noted above has no merit research-wise, it is my opinion that the various state regulations forwarded to EPA in 2010, gave them ammunition to reject the Forest Seedlings request for CUE MBr. The US delegation has been under pressure to reduce CUE allotments since 2005. Also, the lack of notification (burying the rejection in the Federal Register) to Forest Seedling applicants also raises questions as to the working relationship between the Office of Pesticide Programs and the Forest Nursery Industries. Forest Seedlings was not the only sector that had their CUE application denied and not informed. If EPA continues to support QPS, then the political sacrifice (rejection of CUE requests to MeBTOC) might be worth it; however, if EPA backs down to the European Union, then QPS use of MBr for forest seedlings is over.

Training Sessions - 2012 Soil REDs

In early August 2011, USDA ARS released the grant monies for the final year of the Areawide South Atlantic Region MBr Alternatives program. This will allow us to continue to collect data from the Camden, AL MBr soil fumigation trials and also offer a training program for nursery personnel when the new soil REDs are released. As soon as the 2012 labels are approved and training modules are updated to reflect the final rules, we will be in contact with each member to determine the best time to hold the sessions.

Proline Registration Update

In April, 2011, two days prior to the EPA full approval of Proline® (prothioconazole) for use in forest-tree nurseries, we were informed by another branch at EPA that there were concerns about the seed treatment rate and possible mammal toxicity. Their concern was that EPA assumed that every seed sown on every acre in a nursery was consumed by birds, and therefore, the seed-treatment rate would be "toxic to birds." We all know that this is not the case, but EPA always assumes the "worst-case-scenario" in their models. Thus, we were asked to prove that bird predation at this level did not occur and cite "specific studies that documented the lack of bird predation in forest-tree nurseries".

Tom and I gleaned the nursery survey data and reported to EPA what we knew about bird predation and submitted it to Bayer CropScience. EPA then combined the pine nursery and rice actions (another Proline® use) into one examination date and extended the April PRIA date to July 25, 2011. Once they received our report (sent on July 1, 2011), it will take them some time to review and finalize the regulatory documents to grant registration. Since September 30th is the end of EPA's fiscal year, there usually is a push to get items completed by then. Therefore, if EPA wants to count registering prothioconazole on pine nursery and rice on their list of accomplishments for 2011 they must complete their review by September 30. We will hopefully know something by that time.

Research News

USDA Areawide Methyl Bromide Alternatives Trials at Camden, AL

2009 Trial:

The 2011 growing season is the third and final year to monitor the Areawide Methyl Bromide (MBr) Alternatives trial installed in March 2009 at Weyerhaeuser's Pine Hill Nursery in Camden, AL. Presented in Table 1 are the soil fumigants, rates, and types of plastic used in the trial as well as the third year post-sowing and mid-summer loblolly pine seedling densities for each soil treatment.

Chloropicrin had the lowest seedling density of any soil treatment at either sampling period and was significantly less than the MBrC 70/30 treatment (Table 1). Pic +®, Chlor 60, and DMDS + Chlor had similar seedling densities than either of the fumigation treatments containing MBr.

Both Midas® treatments had similar seedling densities at post-sowing and mid-summer. Based on the high number of cull seedlings (43%) produced in 2010 and the low seedling densities in 2011, methyl iodide does not appear to be a viable

MBr alternative at Camden.

Seedling densities in August 2011 were similar among all of the MBr alternatives tested. Methyl iodide treatments produced the fewest number of seedlings. At the end of the 2011 growing season, seedlings will be lifted and evaluated for quality characteristics to determine the efficacy of these fumigants and rates on seedling production.

2010 Trial:

In an attempt to reduce buffer zones within EPA's Re-registration Eligibility Decision (REDs) for all soil fumigants, the 2010 Areawide trial at Camden, AL evaluated MBr alternatives using lowered rates under totally impermeable film (TIF). The 2011 growing season is the second of three growing seasons the trial will be monitored. The soil fumigants, rates, and types of plastic used in the trial as well as the second year post-sowing and mid-summer loblolly pine seedling densities for each soil treatment are presented in Table 2.

Pic +® at 150lb/acre had significantly fewer seedlings/ ft^2 than Chlor 60 at 250 lb/acre under TIF at both post-sowing and mid-summer seedling inventories. Chlor 60 at both 150 and 250 lb/acre under HDPE had similar seedling densities than all of the MBr alternatives tested under TIF at both rates. Loblolly pine seedlings will be lifted from this area at the end of the second growing season (2011) and the plots will be sown to loblolly pine for the 2012 growing season (third year). More inclusive information for both Areawide trials at Camden will be included in a Nursery Cooperative Research Report. -- PJ

Table 1. Soil fumigation treatments, post-sowing (June) and mid-summer (August) loblolly pine seedling densities 3 years post-fumigation at Camden, AL.

Fumigant	Rate (lb/acre)	Plastic*	Components	June Seedling Density (ft^2)	August Seedling Density (ft^2)
MBr	350	HDPE	67% MBr & 33% chloropicrin	24.3 ab**	20.8 b
MBrC 70/30	400	HDPE	70 MBr (98/2) & 30% Solvent	29.4 a	27.8 a
Pic +®	300	HDPE	85% chloropicrin & 15% Solvent	25.3 ab	22.6 ab
Chloropicrin	300	HDPE	100% chloropicrin	22.2 b	20.7 b
Chlor 60	400	HDPE	60% chloropicrin & 40% 1,3 dichloropropene	24.1 ab	23.9 ab
DMDS & Chlor	731	HDPE	79% dimethyl disulfide & 21% chloropicrin	23.8 ab	23.0 ab
Midas® 50/50	160	VIF	50% methyl iodide & 50% chloropicrin	20.9 a	19.7 a
Midas® 98/2	100	VIF	98% methyl iodide & 2% chloropicrin	20.1 a	20.0 a

* HDPE = High Density Polyethylene; VIF = Virtually Impermeable Film

** Means (within a column) followed by the same letter are not significantly different based on Duncan's Multiple Range Test ($p \leq 0.05$).

Table 2. Soil fumigation treatments, post-sowing (June) and mid-summer (August) loblolly pine seedling densities two years post-fumigation at Camden, AL.

Fumigant	Components	Plastic*	Rate (lb/acre)	June Seedling Density (ft2)	August Seedling Density (ft2)
MBr	80% MBr & 20% chloropicrin	TIF	150	27.7 ab**	27.1 ab
			250	28.1 ab	26.6 ab
Chloropicrin	100% chloropicrin	TIF	150	28.9 ab	26.6 ab
			250	29.3 ab	27.7 ab
Pic +®	85% chloropicrin & solvent A	TIF	150	26.6 b	25.7 b
			250	29.4 ab	28.1 ab
Chlor 60	60% chloropicrin & 40% 1,3 dichloropropene	TIF	150	30.8 ab	29.4 ab
			250	32.3 a	30.3 a
		HDPE	150	28.1ab	27.3 ab
			250	29.5 ab	28.3 ab

* TIF = Totally Impermeable Film; HDPE = High Density Polyethylene

** Means (within a column) followed by the same letter are not significantly different based on Duncan's Multiple Range Test ($p \leq 0.05$).

Sporatec on Willow

Sporatec is a broad spectrum, contact fungicide that contains rosemary oil, clove oil, and thyme oil as active ingredients. Sporatec controls certain diseases in a number of ornamental, fruit, vegetable, nut, and grain crops, and is also labeled for use against bryophytes such as liverworts, mosses, and hornworts. Nursery Cooperative staff and some members first heard of this product and its effectiveness against bryophytes in seedling containers while attending the Target Seedling Symposium in Portland, OR in August 2010. Since that time, it has been used by Nursery Cooperative members with good success at controlling liverworts and mosses in containers. For that reason, we speculated that it might have herbicidal activity and offer some control of willow (*Salix nigra*), a troublesome weed in container nurseries.

In May 2011 at International Forest Company in Moultrie, GA, Sporatec was applied to containers that had young loblolly pine seedlings and a number of small willow plants. Seedling containers (5/treatment) were treated with 0, 12, or 24 oz of product per acre. Visual evaluations made 2 weeks after treatment in June and again in August revealed that the willow was healthy, vigorous and unaffected by the compound. So, while the material seems to control moss and liverworts, it does not seem to bother small-seeded hardwoods like willow. Sporatec did not cause injury to the pine seedlings either. While the Nursery Cooperative has no plans of testing Sporatec further for willow control in containers, we would like to test Sporatec in a bareroot nursery that may be experiencing problems with moss in seedling beds. -- PJ

Pesticide Use in the United States

In March, 2011, the Environmental Protection Agency released a 41 page report containing the latest estimates of agricultural and nonagricultural pesticide use in the United States. This report included data from 1998-2007. Summarized below is what I consider some of the more interesting facts.

- U.S. expenditures accounted for 32% of total world expenditure on pesticides, 38% of world expenditures on herbicides, 39% of world expenditures on insecticides, 15% of world expenditures on fungicides, and 25% of world expenditures on other pesticides.
- U.S. pesticides used accounted for 22% of total world pesticides used, 25% of total world herbicides used, 10% of total world insecticides used, 14% of total world fungicides used, and more than 25% of other pesticides used.
- 80% of all conventional U.S. pesticides were used in agriculture.
- In the United States, pesticides used in forest-tree nurseries accounts for 17% of the total usage.
- The chlorine/hypochlorites used in water treatment plants account for 51% of total pesticide usage.
- Among the top 10 fumigants in terms of pounds applied in the agricultural market were metam sodium, 1,3-dichloropropene, methyl bromide, and chloropicrin.
- Glyphosate is the #1 used active ingredient, atrazine is #2, metam sodium is #3, metolachlor-S is #4, 2,4-D is #7, MBr is #8, chloropicrin is #9, pendimenthalin is #10, chlorothanil is #12, and chlorpyrifos is #14
- In the Home & Garden market, 2,4-D is #1 and glyphosate is #2.
- The agricultural sector accounted for over 60% of total expenditures on pesticides. This sector dominated the herbicide, fungicide and other markets but tied the Home and Garden usage for insecticides.
- The most commonly used organophosphate insecticides are: chlorpyrifos #1, malathion #2, and diazinon #8.
- Pesticides accounted for about 3% of total farm expenditures.
- Herbicides remained the most widely used type of pesticide in the agricultural market sector.
- 78 million households use some form of pesticides.

This document contains many more facts, tables and graphs on pesticide usage and can be found at http://www.epa.gov/opp00001/pestsales/07pestsales/market_estimates2007.pdf -- TS

Pendulum AquaCap: How it Works on Spurge

Pendulum AquaCap™ (PAC) (pendimethalin) is in the dinitroaniline class of herbicides, which are soil-active and applied as a preemergence treatment for the control of

20 Years Ago...

The Fall 1991 Newsletter began on the down side with the report that over 80 million pine seedlings and 3.2 million hardwoods were lost or culled due to very heavy spring rains throughout the region. Ken McNabb reported the results of a nitrate monitoring study. David South reported the outcome of a November 1991 freeze event and that longleaf pine with larger RCDs had less disease brown-spot needle blight incidence. New studies dealing with pesticide leaching, longleaf storage and loblolly pine storage/survival study were outlined. This issue also contained a reminder to winterize your sprayer. News of personnel changes from Hauss Nursery in AL, the Tennessee Nursery at Pinson, and the State Nursery in North Carolina were included. A reminder from the State of Georgia that the 1992 Southern Nursery Conference would be held at Calloway Gardens in July. The core Nursery Cooperative staff remained the same since the last newsletter.

small-seeded weeds such as spurge. After PAC has been applied, the herbicide must be watered in to establish a soil-herbicide zone in the top two inches of the soil. Absorption of the herbicide by the plant occurs during germination in the newly formed meristematic root tissue that emerges from the spurge seed into the soil. Once the herbicide penetrates the spurge root, the process of cell division is inhibited by blocking the protein tuberin. Tuberin serves in spindle fiber formation which aid in chromosome separation. Developing spurge root cells can no longer divide and grow normally, and are rendered distorted, swollen, and non-functional. Without the germinating root radicle, germination terminates and the spurge plant dies. Larger weed seeds with more starch reserves are able to penetrate the soil-herbicide zone and are generally unaffected by PAC.

Likewise, PAC has no effect on spurge plants that are visible at the time of herbicide application. When applied at sowing, PAC can remain effective at controlling spurge for several weeks, but may not inhibit spurge germination that occurs later in the summer. Spurge may also develop later in the growing season in tractor paths where the soil-herbicide zone is disrupted. It is speculated that spurge that develops on the shoulders of nursery beds may have germinated where a soil-herbicide zone was not established due to PAC running off of the shoulders and not moving down the soil profile. PAC does not require tilling into the soil like other dinitroaniline herbicides such as trifluralin (Treflan®). Tilling PAC would break up the soil-herbicide zone required for contacting germinating spurge seeds.

The Nursery Cooperative has tested PAC in ten nurseries over the last four years. Results from the PAC trials indicate good spurge control with no adverse effects on loblolly pine seedling density, root collar diameter, or height when applied at sowing. *However, herbicide galls can form on seedlings when PAC is applied as early as 2 weeks and up to 8 weeks post-sowing. Trials in 2010 tested PAC at sowing in 5 nurseries and no galls were produced.* Based on these results, some nursery managers have begun using PAC in production areas to control spurge. Nursery managers that intend on using PAC for the first time in their nursery should do so in small areas first before large-scale applications. -- PJ

Roots - The Focus on This Lifting Season

A period of peak nursery activity is just around the corner. All of your worrying, sweating, fertilizing, irrigating, etc. will soon produce the fruits of your labor when lifting begins. I hope your primary focus is not so much on how good the seedling shoots look at lifting but rather on how much of the root system comes up out of the ground and ends up in the planting hole.

Historically, as we know, seedlings were initially lifted by hand, loosened with shovels. In 1984, Jack May reported that, depending upon soil texture and seedling density, 1 person could hand-lift up to 80,000 seedlings. (May, J.T. 1984. Southern Pine Nursery Handbook. USDA Forest Service Southern Region). The modern mechanized lifters came into use beginning in 1958. Today, the percentage of seedlings lifted by machine far outweighs hand-lifted seedlings.

Hand-lifting of seedlings is generally done by nurseries early in the lifting season when the quantity of seedlings requested does not justify starting the use of the mechanical lifter. Nurseries that cannot justify the purchase of a mechanical lifter must hand-lift all their seedlings. Hand-lifted seedlings will have larger root systems than mechanical lifted seedlings. I recently spoke to a consultant forester who works for one of the larger reforestation companies in the south and I asked him where he purchases his seedlings. He named a small bareroot nursery that surprised me. When I asked him why he choose that nursery, his answer was "they produce seedlings with larger root systems."

Although hand planters do not like to hear this, larger seedling root systems often exhibit greater root growth potential which can, depending upon environmental conditions, result in greater seedling survival. Regardless of how the seedlings are lifted, bareroot culture inherently causes root injury and is difficult to totally eliminate. In 1987, Jim Rowan reported that mechanical lifters can remove from 35 – 77% of small roots from the seedlings which can have a significant impact on seedling survival.

"Root stripping" is a term we generally associate with hand planters physically running their hand over seedlings to remove what they consider "excess" roots to make planting easier. Most planting contractors and consulting foresters know that any form of root pruning by tree planters - whether root stripping or pruning - should not be done. Root stripping can, however, also occur in the nursery when a mechanical lifter (that is not properly adjusted or runs too fast or is operated in less than optimum soil conditions) leaves small fibrous roots in the field. When this occurs, your season of hard work is left behind in the nursery beds.

The results of a lifter study in 3 different nurseries were presented at the 2011 Contact Meeting. I'd like to share some information that you may find helpful as you prepare for this lifting season:

- 2-row Mathis lifter left 17 % more roots in the soil

Know Weeds! ❧ Sicklepod

Sicklepod (*Senna obtusifolia*) is an annual weed in the family Fabaceae (Leguminoseae) that can become a problem in forest tree nursery beds. Sicklepod is found throughout the southeastern US and has been reported as far north as Michigan and New Hampshire. The genus name *Senna* is Greek and means "aromatic plant," which references the foul odor given off when sicklepod is crushed. The Latin *obtusifolia* refers to the shape of the leaflets and means "blunt" (obtuse) and "leaves" (folia).

Sicklepod is sometimes confused with coffee senna (Cassia occidentalis), often called "coffee weed." Sicklepod can grow 1-6 ft tall and form 4-6 egg-shaped leaflets (1-3.5 in. long) that are opposite on the stem. Coffee senna differs by having tapered, more pointed leaves. The pair of sicklepod leaflets furthest from the main stem is the largest and the pair closest to the stem is the smallest. In late summer through the fall, yellow flowers develop from leaf axils where the stem meets the leaf.

Sicklepod reproduces by seed that are housed in long (4-8 in.) "sickle"-shaped pods. It is believed that sicklepod seeds have medicinal properties and have been used for 6000 years as laxatives. Chinese herbal pills that contain sicklepod seed can be purchased online as a treatment against airborne allergens. Other reported benefits of sicklepod seed include an aid for better vision, lowering cholesterol and blood pressure, and prevention of arterial plaque.

When found in seedling nursery beds, sicklepod probably has an opposite effect on nursery managers by raising their blood pressure. Fortunately, the herbicide clopyralid (Stinger®) has a supplemental label in AL, AR, GA, LA, MS, NC, SC, TN, TX, and VA for the control of sicklepod in forest tree seedling beds. Small acreages in the nursery with sicklepod should be treated with the low rate (1/4 pint/acre) at first and larger areas treated later once the manager has a feel for the herbicidal effects. To avoid the possibility of stem curling, which can occur with clopyralid, it's best to wait and apply the herbicide when seedlings have grown past the "umbrella stage" or 5 weeks post-sowing. Results can differ depending on the specific nursery, but at one nursery in Virginia, no injury was reported on as many as 30 different hardwood species from using clopyralid. However, black locust and redbud seedlings in the Leguminoseae family can be injured when using clopyralid, so be careful around those tree species. -- PJ

than hand lifting.

- 2-row Mathis lifter had 33% less white root tips (a measure of root growth potential) than hand lifting.
- 2-row lifter operates 4-5 times faster than full bed lifters. Minimizing seedling injury and maximizing root recovery may not be achievable at these speeds.
- Nearly all nurseries have gone to full bed lifters due to the inherent problems associated with 2-row lifters. The Nursery Cooperative cannot find a justification for their continued use.
- Depending on the length of the lifting season, beds which were undercut in early/mid fall may need to be "loosened" again just before lifting. This can be accomplished by using a separate tractor with a wrenching blade to loosen the soil and seedlings on the beds you intend to lift that day. Another option is to use the lifter blade on the full bed lifter at the time of lifting.
- In finer texture soils, the use of a lifter blade increases seedling root retention. Some managers hand-lift seedlings on fine textured soil, especially when the soil is moist.
- The use of the lifter blade may also be beneficial on other soils/fields when lifting conditions are not optimum such as in heavier or wetter soils.
- Caution should be used when increasing tractor speed without adjusting belt and or beater bar speed. Coarse textured nurseries are more forgiving than fine texture nurseries with respect to lifting and seedling root retention.
- Some nurseries have modified their lifter to allow speed changes without sacrificing seedling quality.
- In two of the study nurseries there was no difference between root biomass in full bed lifters operate at normal speed and a faster speed. However, while root biomass lifted per seedling was the same for both speeds, there was a significant reduction in the root growth potential for the faster speed indicating injury or stress to the roots, even though not visually apparent.
- At one nursery, their faster tractor speed had greater root growth potential than the normal speed indicating their initial adjustment at the beginning of the season for their normal speed was not optimum for seedling root retention. -- TS

Nursery 101

Fungicide Mobility

Fungicides can be classified as to either their active ingredient, role in protecting the plant, breadth of activity, mode of action, chemical group, FRAC group or their mobility in the plant. For example, Proline® can be classified as follows:

Active Ingredient	Propthioconazole
Mode of Action	Demethylation inhibitor (DMI)
Chemical class	Triazole
Mobility in plant	Systemic
Role in Protection	Protectant and early infection
Breadth of activity	Single-site
FRAC code	3

Within the mobility classification, fungicides can be further divided into 2 broad categories; 1) contact fungicides and 2) penetrant fungicides. If a fungicide is applied to a seedling and it is absorbed, i.e. taken up by the seedling, the compound is considered a penetrant fungicide. However, if the fungicide stays on the seedling surface, adhering in an extremely thin layer, and is adsorbed by the seedling, the fungicide is considered as a contact fungicide.

Contact fungicides, also called protectants, include most of the old fungicides such as captan, chlorothalonil, copper compounds, maneb, mancozeb, sulfur and thiram. When using contact fungicides you must remember:

1. They must be applied before the spores land and infect the seedlings.
2. They do not have an effect once infection has begun.
3. They act to prevent germination of the fungal spore.

Penetrant fungicides, also called systemic, enter into the seedling, extending beyond the cuticle into the seedling tissue. These fungicides appeared in the market in the 1960s. All penetrant fungicides are systemic since they enter and move to varying degrees throughout the seedling. Systemic fungicides can be further classified based upon their degree on movement within the seedling.

1. Translaminar fungicides (localized penetrants) – remain in the area of initial contact or have very little movement. Examples of this type include iprodione.
2. Xylem-mobile fungicides (acropetal penetrants) – move upward in the seedling from the point of entry through the xylem. Tissue produced after the application is protected. Examples include azoxystrobin, prothioconazole, mefenoxam thiophanate-methyl, propiconazole, myclobutanil, triadimefon.
3. Amphimobile fungicides (true systemic penetrants) – move throughout the seedling in the phloem and xylem tissues. Examples include many of the phosphonates such as fosetyl-aluminum, phosphorous acid.

When using penetrant fungicides you must remember:

1. Penetrants can stop or slow infection which has occurred within 72 hours. This is called kick-back or reach-back effect.
2. They need to be applied soon after initial infection.
3. Penetrants are ineffective once the fungus begins producing spores on the infected seedling.
4. They have a limited curative activity. -- TS

Leadership 101

10 Things that Will Get You Fired

This is a tough economy and having a job is a blessing, not a right. I'm reminded of this every time I see a friend of mine who has been out of work for a year after his company downsized. I also recently heard that companies don't want to hire people that have been out of work for an extended period of time. With this said, it is probably a good time to examine our activities on the job to see if a pink slip could come before the next paycheck.

There are several articles on the internet with this theme; however, I've modified an article that caught my attention by Kate Lorenz with Careerbuilder.com. Here is what to do if you want a spot in the unemployment line:

1. Don't bother learning what is expected of you. Are your assumptions as to what you are supposed to do in sync with what your supervisor is expecting from you? It may be a good time to sit down with your supervisor and eliminate any ambiguities. This is very important if you have a new supervisor.
2. Use the phrase "It is not in my job description" frequently. Doing the bare minimum sends a clear message to your supervisor. People with initiative and drive standout and are more likely to survive in a downsizing.
3. Go shopping in the company supply closet. Everybody ends up with the company pens and pencils at home. Stealing from the company is one of the surest ways to guarantee a spot in

the unemployment line. How do you use the company vehicle? Is padding your expense account a norm? Do you raid the company chemical shed for your own use at home?

4. Abuse company technology. In a time of instant messaging and social networks, don't think that your supervisor won't notice the amount of time you spend communicating with friends at work. Never be stupid enough to use the company computer for anything either illegal or X-rated.
5. Complain about your job to anyone that will listen. If your attitude gets back to your supervisor, you may get put out of your misery. Don't even think about voicing you're feeling about your job on Facebook, these are open for everyone to read.
6. Lookout for #1 – forget that your part of a team. Arrogance and an egotistical attitude will only help move you one spot up in the unemployment line. Helping your coworkers is just plain smart. Likeable employees move up in the company ranks more rapidly.
7. Consistently bring your personal life to work. It is inevitable that personal business will pop up during business hours. Keep these activities to a minimum. Although these activities may not get you fired, they can be annoying to coworkers.
8. Consistently work "abbreviated" workdays. Regularly come in late, take extra time for lunch, and leave early. The only thing you may find yourself on time for is the opening of the unemployment office in the morning.
9. Treat deadlines more as guidelines. Don't procrastinate, get the job done. They are called deadlines for a purpose. Consistently miss them and your job may be dead.
10. Abuse your company's sick leave policy. We all are sick at times, but can your coworkers tell what day of the week it is by when you call in sick? -- TS

Member News

International Forest Company

Christopher Rosier was hired effective October 4, 2010. Christopher will assume the role of Marketing and Product Development Manager for the company and will be based at IFCO headquarters in Moultrie, Georgia. Christopher was formerly Nursery Quality and Development Manager with CellFor Inc., the leader in varietal pine tree seedling production. Prior to his work with CellFor, Christopher was the Forest Geneticist for Smurfit-Stone Container Corporation (SSCC) where he managed the tree improvement and nursery operation programs for the company. He has undergraduate degrees in Forest Hydrology and Ecosystem Assessment and a Master of Science in Forest Genetics from North Carolina State University. He has authored a number of scientific papers on vegetative propagation and has presented on tree improvement and nursery research at conferences throughout the U.S. Christopher is a member of the Georgia Forestry Association, Society of American Foresters and XI SIGMA PI – National Forestry Honors Fraternity.

Clark Duncan was hired effective August 25, 2010. Clark will assume the role of Assistant Production Manager. He will also be based in Moultrie. Clark has worked in the pharmaceutical business prior to joining IFCO. He has an undergraduate degree in Biology from Valdosta State University where he was a member of the Alpha Lambda Delta honor's society.

Blake Lipscomb was hired effective May 31, 2011. Blake will assume the role of Seedling Quality and Operations Manager for the company. Blake graduated in May 2011 with a degree in forestry from Auburn University. While at Auburn, Blake worked for the Southern Forest Nursery Management Cooperative assisting faculty, staff and graduate students with data collection from various nursery field trials. He has also worked in the university lab accessing seedling quality and has experience conducting and maintaining research studies in a greenhouse environment. Blake's experiences will continue to improve on our company's product quality and efficiencies, thus improving the quality we provide our customers.

Plum Creek

A number of changes have occurred at Plum Creek recently. Ken Woody retired from the Jesup Nursery on July 1st with 41 years of forest nursery management. He and his wife Ella Louise now live in SC. Ken's new cell phone number is 803-496-6227. Kyle Owens was promoted to Nursery Manager of the Jesup Nursery to fill Ken's shoes. Peyton Warren was hired as a Nursery Technician at the Pearl River Nursery in June. Stephen Daniels became the newest Nursery Technician at the Shubuta Nursery in May and Andrew Strickland is the Nursery Technician at the Jesup Nursery.

Weyerhaeuser

As most of you know, Ralph Bower will be retiring after the first of the year. For those of you who know Ralph, his knowledge, experience, and unique personality will not be replaced. During the remainder of his tenure, Doug Shelburne will be transitioning into the manager's role at Pine Hill Nursery. He comes to Weyerhaeuser with over 20 years experience working previously for IP and Smurfit-Stone. With both managerial and grower experience,

Weyerhaeuser is expecting the transition to be smooth.

Hank Van Drop recently progressed into the role of the seedling sales manager responsible for clientele in North Carolina and Virginia. Ben Whitaker was hired to fill the vacant position at the GHW Nursery in Washington, NC. Ben received his Bachelor of Science and Master of Science degrees in Forestry from Auburn University and is originally from Birmingham, AL.

Other News & Notes

2011 Seedling Disease Clinic

The staff at Auburn saw a wide spectrum of bareroot and container seedling problems this past year in the laboratory and at site visits. The total number of seedling health issues was down compared to previous years but included:

1. Poor initial growth due to anaerobic conditions.
2. Freeze injury in pines and hardwoods.
3. Pitch Canker in container seedlings.
4. Rhizoctonia Foliar Blight in container seedlings.
5. Cultural/management problems in container and bareroot nurseries.
6. Tip Blight in bareroot seedlings.
7. Nematode problems.
8. Insecticide damage in bareroot nurseries.
9. Insect feeding on outplanted trees.
10. Hardwood germination problems in bareroot and container nurseries.
11. Possible herbicide injury on out-planted seedlings.
12. Heat related bareroot problems.
13. Top clipping problems. -- TS

Be on the Lookout! - 2012 Survey of Nursery Practices

In June 2012, we will be conducting an important and necessary survey that will cover all aspects of nursery practices in the Southern United States. When the last comprehensive survey was completed in 1980 (Boyer & South), we would be safe in saying 99% of those reading this newsletter were not involved in that survey.

- Why is it needed? We need to document current nursery practices to see how they have changed in the 30 years since the last survey. Also, the Nursery Cooperative is your advocate to EPA, USDA, APHIS, State Plant Boards, State Departments of Agriculture and other government agencies interested in seedling production issues. We are routinely asked to verify pesticide usage, answer registration questions on how chemicals are used in seedling production, identify and quantify pests in nurseries, provide tree species and acreage information, and provide information on cultural activities. Recently, as part of the Proline® registration process, we were asked to quantify bird predation of pine seed in southern nurseries. After we answered their questions EPA's response was "is 30-year-old data the most recent you have?"
- Who will be included? This survey will include bareroot and container nurseries in the 13 southern states and will be sent to Nursery Cooperative members and non-members. Container nurseries were not included in the 1980 survey.
- What will be asked? There will be anonymity by company and state. The survey will cover all aspects of nursery production such as quantities produced, sowing, fumigation, pest control, soils/media, fertilization and irrigation, lifting etc. We will not ask for financials such as salaries or profit margins or other specific company information. The format we are leaning toward at this time is an editable online PDF document that can also be printed out. We will try to minimize the amount of typing and use as many check boxes with common answers as possible.
- When will I get the survey? We will do some beta-testing of the survey prior to its release, but our goal is to send the survey out by June 1, 2012. If you did not get a copy of the 1980 survey that was passed out at the Contact meeting in Augusta, Georgia, let me know. This will give you an idea of the types of questions to be asked.
- Your participation in this survey is absolutely critical since Nursery Cooperative members grow >85% of all the seedlings in the southern region. A good response from our members will allow us to make accurate answers when government agencies ask questions. -- TS

Reflections of the 2011 Growing Season

I would wager that if asked what you remember of the 2011 growing season it would be summed up in one word – HEAT! I have received a number of phone calls this past season related to heat concerns and seedling performance. To me, it seemed that the warm weather began in early February and we moved right into summer. Reality sometimes is far from perception. So, how did this year's temperatures compare to the last two growing seasons? Table 1 lists the average high temperatures and includes the states of VA, NC, SC, GA, AL and FL. This data can be found at http://www.ncdc.noaa.gov/oa/climate/research/cag3/cag3.html.

Table 1. Average high temperature in °F and ranks for the southeast region of the United States.

	2011	2010	2009	Record Year & Temperature
January	41.8 (99)*	41.0 (107)	44.8 (71)	1950 - 57.7
February	50.3 (35)	41.0 (113)	47.4 (67)	1927 - 56.4
March	56.3 (42)	51.8 (99)	55.2 (50)	1945 - 63.2
April	65.3 (11)	63.9 (28)	61.7 (70)	1954 - 66.6
May	70.3 (51)	72.6 (10)	70.4 (48)	1896 - 74.4
June	79.5 (5)	80.4 (2)	78.0 (20)	1952 - 80.8
July	81.2 (5)	81.4 (3)	77.6 (106)	1993 - 82.0
August	80.4 (6)	81.1 (3)	78.6 (49)	2007 - 82.3

*The numbers in parenthesis indicate ranking out of the last 117 years.

While, the 2011 growing season was warm, it was not as warm as 2010 if you compare the rankings between years. The actual temperatures were not that much different between 2010 and 2011 for April to August. However, February and March were significantly warmer in 2011 than in 2010 with February 2011 being over 9°F warmer than 2010. So, in actuality, 2011 has been one for the record books! Any ranking less than 13 indicates that month was in top 10% warmest months in the last 117 years.

In addition to the high temperatures, many nurseries were concerned about the lack of rainfall. The typical erratic spring/summer showers created a "feast or famine" situation. A few nurseries had little to no rain for April and most of May while others had enough rainfall to take the pressure off the irrigation system.

This summer we had reports of heat related injury to seedlings. The first few weeks following germination is when seedlings are most vulnerable to heat injury. If the air temperatures during this time exceed 90°F, nurseries will frequently begin applying irrigation indending to control soil temperatures. Watering during the heat of the day can reduce surface soil temperatures by as much as 20°F and air temperatures near the seedlings by 10 to 15°F, depending upon the relative humidity. Net photosynthesis is also affected as temperatures increase. In one study (http://coweeta.uga.edu/publications/10329.pdf), there was no significant change in net photosynthesis from 60 to 77°F. However, between 77 and 95°F net photosynthesis declined over 30%. In another study (http://www.ncbi.nlm.nih.gov/pmc/articles/PMC438200/pdf/plntphys00282-0113.pdf), a similar decrease of over 30% was observed between 86 and 104°F.

Nursery	Date	Time	Location	Bed Temperatures °F
A	22-Jun	1:30 PM	No shade	104
			Shade between drills	90
	22-Jun	3:30 PM	No shade	110
			Shade between drills	100
	22-Jun	3:30 PM	No shade	120
B	9-Aug	11:30 AM	No shade	117
			Shade between drills	94
	9-Aug	11:45 AM	No Shade following irrigation	97
			Shade between drills following irrigation	82

This past summer we measured bed temperatures at several times and locations using an infrared thermometer (see table at left). The results at left are from 2 nurseries that only used soil stabilizer following sowing. I was visiting another nursery later this summer that used mulch and soil stabilizer on a portion of the fields and only soil stabilizer of the remaining fields. The manager's comment to me was "the mulch paid for itself this year. The seedlings in the fields that only had soil stabilizers struggled for the first portion of the summer. Those areas with the mulch and soil stabilizer had no heat problems." The use of bed mulch not only helps conserve water, it also helps to reduce soil bed temperatures which is important in the early seedling growth period. -- TS

Clean Water STILL Matters

Pitch canker has once again reared its head in a year when longleaf pine is in high demand and nearly all nurseries were sold out before sowing. In the Spring, 2008 Newsletter (Clean Water Does Matter, pg 7-8) we discussed the importance of using clean water when soaking seed. Reusing water to soak seed lots resulted in pitch canker being spread from an infected seed lot to other seed lots.

Stratification has been used to break the dormancy and improve germination rates of southern pine seed for years. An essential part of the stratification process is allowing the seed to absorb water necessary for the biochemical processes leading to germination. This includes weakening the seed coat, activating enzymes and breaking down starch reserves. For many years, seed was mixed with a moist medium of either sand, sawdust, peatmoss, vermiculite or other material. The most commonly practiced method today is the two-step process called "naked stratification" in which seed is soaked in water for a number of hours, drained, surface dried and placed in plastic bags and cold stored at 2-5°C for a period of time. The water soak step was the problem with this year's pitch canker incident.

Pitch canker infected longleaf seed (not known at time of seed soaking) was soaked in water, removed, drained and then put into cold storage. Rather than dumping out the water, another longleaf seed source was soaked in the same water prior to placing into cold storage for stratification. Following germination, longleaf seedlings in both seed-lots began to die off in a random pattern throughout the nursery. Samples of seedlings were examined by the Nursery Cooperative staff and pitch canker infection was confirmed.

We do know that longleaf pine clones differ in the incidence of pitch canker in the seed orchard. Carey et al found a positive correlation between the incidence of pitch canker in the longleaf seed orchard and seedling mortality in the nursery. This study also concluded that removing seed orchard clones based on the incidence of pitch canker could reduce the infestation of collected seed and the percent of seedlings that become diseased in the nursery (*Carey, WA., SW. Oak and SA. Enebak. 2005. Pitch canker ratings of longleaf pine clones correlate with Fusarium circinatum infestation of seeds and seedling mortality in containers. Forest Pathology 35:205-212.*)

The moral of the story: 1) Change your soak water between seedlots. This is especially true for longleaf seed. 2) If you have reason to suspect a seedlot, take extra care even to rinsing the container used for soaking with bleach or other disinfectant between uses. -- TS

MEMO: H-2B Wage Rule Delayed 60 Days

From: Nursery Management Weekly News Update Sept 22, 2011

Nursery Cooperative Members: Here is a timely article on the H-2B Wage Rule. At the Advisory Meeting we plan to have Linda Casey, Alabama State Forester discuss their plans for mitigating the effects of this rule on reforestation programs in the southern US.

Craig Regelbrugge, ANLA's VP for Government Relations, is reporting that the Department of Labor is delaying the implementation of the H2B wage rule by 60 days. "Hill sources tell us that this delay is happening in the face of the fact that the Appropriations Committee adopted an amendment blocking DOL from enforcing the rule," he said. In other H-2B news, PLANET recently filed suit in federal court to stop the implementation of unwarranted and unjustifiable wage increases proposed by the U.S. Department of Labor (DOL) for certain foreign workers. The new regulation specifies a 40 to 50 percent wage increase for all H-2B holders and would take effect Sept. 30. The first goal of this legal action is to obtain a temporary restraining order to block the rule from taking effect on Sept. 30. If that effort is successful, then a preliminary injunction request will be sought.

The case, Professional Landcare Network et al v. Solis, was brought by several program users, including PLANET members and several other national organizations, who believe H-2B program workers do not "take" jobs from Americans who want them but rather take the jobs American workers have left vacant. The lawsuit argues that the DOL violated the Administrative Procedure Act (APA) and the Regulatory Flexibility Act by issuing this regulation without going through what is termed "notice and comment" rulemaking. In declaration filed as part of the suit, PLANET CEO Sabeena Hickman outlines the irreparable harm that the rule would place on PLANET members who use the H-2B Program.

"The H-2B employee has been the backbone of our members and the American workforce for many years," said PLANET President Gerald J. Grossi. "If this regulation is not stopped, the H-2B program will cease to be an option, and without these workers, our industry cannot survive. PLANET has to take a leadership role as a plaintiff in this case because it is so important for our members and the industry in these harsh economic times to have the workforce necessary to fulfill their commitment to their customers."

Many of PLANET's members who use the H-2B program report that they have recently received supplemental prevailing wage determinations that range from a low of $1.90 per hour to a high of $7.01 per hour. At the low end, that results in a 20.3 percent increase in hourly wage cost and, at the high end, a 78.1 percent increase in hourly wage costs. The average increase in hourly wage costs is 40 percent.

The Final Rule, with its accelerated implementation date, will stunt, if not reverse, the growth of PLANET's H-2B members' businesses and the career opportunities of their year-round, U.S. workers, according to PLANET.

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