Southern Forest
Nursery Management Cooperative
Spring 2007

3301 Forestry and Wildlife Sciences Building
Auburn University, Alabama 36849-5418
phone 334.844.1012
fax 334.844.4873

Director's Report

Another winter and lifting season have passed since our last newsletter. I hope that all your seedlings are out of the ground and that everything is ready for the spring sowing season. A lot of nursery-related research was finished last fall and there are a number of pesticide issues looming on the horizon. We continue to work on the MBr issue (both CUE and QPS), the re-registration of pesticides, and the evaluation of alternative fumigants, fungicides and herbicides.

Membership

I would like to formally welcome IFCO back into the Nursery Cooperative as a full member. Wayne Bell called early last December and inquired about rejoining the Coop. IFCO had been a member since 1989 and when they were purchased by Mobley in 2002 they dropped their membership. We'll update the Coop Directory at the end of the year, but in the meantime, Wayne can be reached at: International Forest Company, 1265 Ga. Hwy. 133 North, Moultrie, GA 31768, 800-633-4506, wbell@interforestry.com. With IFCO joining the Nursery Cooperative, we currently have 20 members.

Contact Meeting

The 2007 Nursery Cooperative Contact meeting is scheduled for July 10-12, 2007 in St. Simon's Island, GA. We are working with Plum Creek and Rayonier for the nursery tour and research plots. As is the normal practice we will have an indoor session of Coop Staff presenting their most recent research findings. Please put that week on your calendar so that you can plan to attend.

Hotel reservations can be made by calling the Best Western Island Inn at 912-638-7805 or 800-673-6323. Make sure you mention that you are with the group from Auburn University. The group rate is $85/night for July 10-13, 2007.

Advisory Meeting

The Advisory meeting is scheduled for Wednesday and Thursday, November 7 & 8, 2007 at the School of Forestry and Wildlife Sciences Building at 602 Duncan Drive. We will set up the meeting using video conferencing for those who cannot 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 technology you will need. Place those days on your calendar and more information will be available later this year.

Pesticide News

MBr Issues

The final ruling on the 2007 CUE was published in December 2006. In their ruling EPA required the maximum allocation (1,921,702 kg) of MBr for 2007 from existing stocks with the remaining allocation (3,900,000 kg) either from new production or imports. The use of existing MBr stocks over new production was due to MBr 2005 CUE stocks not used by growers, MBr used in research trials and from the amount of sulfuryl fluoride now being used in storage treatments. With EPA requiring the use of existing MBr stocks over new production, the amount of MBr stocks will continue to decrease and will affect the price of the material. All member nurseries within the Nursery Cooperative should have received a letter from me indicating that, as a member of the Nursery Cooperative, you were legally authorized through the Parties of the Montreal Protocol to have access to MBr through the Critical Use Exemption process.

QPS

The ability to use MBr in forest-tree nurseries for QPS requirements for intra-state and inter-state seedling production continues to move along in the southern plant boards.

Here is the status by state: AL, AR, GA, LA, MS, TX - done, SC - done, but waiting for passage by State Legislature as either a law or regulation (incidently, many letters were sent in, not a single negative response); OK, NC, VA - working on language & moving along, TN - no recent activity.

Tom and I will continue to work with the State Plant Protection Officers throughout the southeast to get their help in drafting language to support intra-state use of MBr and let you know of the progress. Hopefully, by the time of the Contact Meeting, those states that are finalizing their language will be moving on to the next step for passage (30-day comment period or beyond).

Chloropicrin

From 1985-1988, as part of my Master of Science degree at the University of Minnesota, I had a research project that examined alternatives to MBr for the production of forest-tree seedlings. This project was funded by the National Agricultural Impact Assessment Program through the US Department of Agriculture. One of the alternatives tested in that Wisconsin nursery was 100% chloropicrin at 260 lbs/acre under a tarp. In those Wisconsin nursery trials, which tested both chemical and biological treatments, chloropicrin was, by far, the best alternative in that trial. The study was published in 1990 as *Managing soilborne pathogens of white pine in a forest nursery* in Plant Disease 74:195-198 by Enebak, S.A., M.A. Palmer and R.A. Blanchette. There is a picture of seedlings with the various treatments on the Nursery Cooperative web site: http://www.sfws.auburn.edu/sfnmc/web/chloro.html

The Nursery Cooperative began testing MBr alternatives in 1990 and since 1995, the Nursery Cooperative has been a proponent of using chloropicrin under a tarp as an alternative to MBr fumigation. Some articles summarizing the effectiveness of chloropicrin as a soil fumigant include South, D.B., Carey,

W.A. and Enebak, S.A. 1996. *Use of chloropicrin as a soil fumigant in pine nurseries.* Proceedings of the 3rd IUFRO Working Party S7.03-04; South, D.B. and Carey, W.A. and Enebak, S.A. 1997. *Chloropicrin as a soil fumigant in pine nurseries.* The Forestry Chronicle. 73:489-494; and South, D.B. 2006. *Chloropicrin – 300 lbs/acre under a tarp: An effective alternative to methyl bromide fumigation.* Technical Report 06-01.

Until mid-December 2006, we believed that tarped chloropicrin would remain as a soil fumigant since it is also used as a warning agent in other fumigants. Our rational was that if trace amounts in the air cause a burning sensation in the eyes (which serves as a warning to those who might enter a fumigated area), surely it ought to be safe enough when injected into the soil and covered with a plastic tarp.

As part of the Food Quality and Protection Act (FQPA), all pesticides are scheduled for re-registration by EPA. Chloropicrin is now in step 3 of a 6-step process to re-register for use in the United States. In mid-December, EPA released a 500+ page risk assessment document that addressed the use of chloropicrin and, at that time, I was given the impression that since this was early in the process, there was nothing to be "alarmed" about. However, in the past month, the tone has changed as chloropicrin producers and users are now "concerned" that the risk assessment is wrong and EPA is "concerned" about the effects of chloropicrin on human health.

The most pressing concern from the users/producers is the suggestion of a 1400 meter (4600 feet or 9/10 mile) buffer zone between an occupied structure and the pesticides' use. The 1400 m restriction comes from an atmospheric study indicating how far chloropicrin moves in the atmosphere after use. I have been told that if the buffer zone requirement stays at 1400 m, there is not a single field in Florida where chloropicrin could be used. While the compound is used primarily as warning agent in MC2, chloropicrin is a good fumigant in and of itself (e.g. Telone 35C, MC33 and Pic Plus), thus EPA is concerned about toxicity of chloropicrin. The buffer zone pertains to all chloropicrin use in all mixtures, rates, formulations and application methods. One of the other concerns by EPA is that it "smells bad" and that it is a "strong lachrymating agent" or causes irritation to the eyes.

In the proposed risk assessment, EPA requested chloropicrin users to answer 27 questions about crop production, pest pressures, production impacts, alternatives, acreage, rotations, pounds of chloropicrin used, etc. Using the crop profile prepared in 2002 by Bill Carey and a survey of chloropicrin use by Coop Members in December 2006, the Nursery Cooperative responded to EPA's 27 questions concerning its use in the production of forest-tree seedlings in late January 2007.

In early February, a number of crop and commodity groups approached the Office of Pesticide Policy and Management at the USDA and asked USDA to request a meeting with EPA to address the issues outlined in EPA's risk assessment published in December 2006. EPA agreed to the meet with the Crop Protection Coalition and the Nursery Cooperative was invited to represent the forest-tree nursery interests with respect to chloropicrin use. Thus, my "ACTION ITEM – VERY TIME SENSATIVE" e-mail in mid-February to all nurseries within the Cooperative asking about nearby structures. If the 1400 m buffer zone were to remain as modeled by the EPA, the numbers returned to me indicated that 32 of 35 nurseries within the Nursery Cooperative would not be able to use chloropicrin. The meeting of the Crop Protection Coalition with EPA took place on Tuesday, February 27 in Washington, D.C. and I was given 15 minutes to tell EPA about forest-tree nursery production and the effects of limiting chloropicrin use. In addition to forest-tree nurseries, five other commodity groups presented information on their crop production systems. The results of the February meeting will not be known until EPA issues their proposed rules concerning Chloropicrin in June/July 2007. About all we can do at the Nursery Cooperative is respond to EPA's questions and give them justification for continued use of the fumigant when they make their rulings and decisions. There are some lobby groups and task force groups working on this as well.

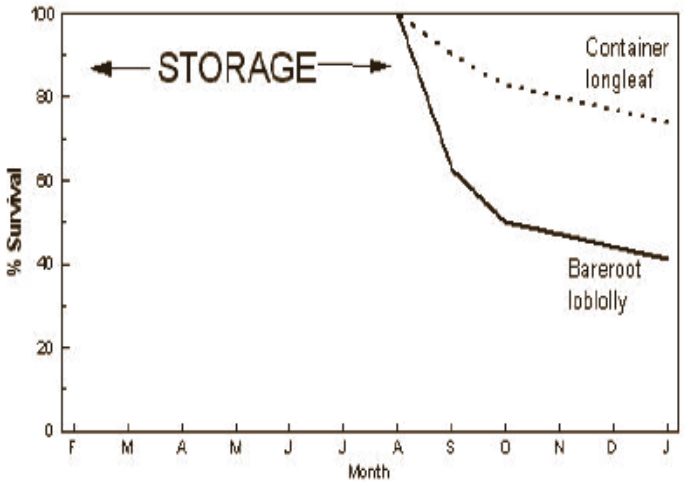
Research

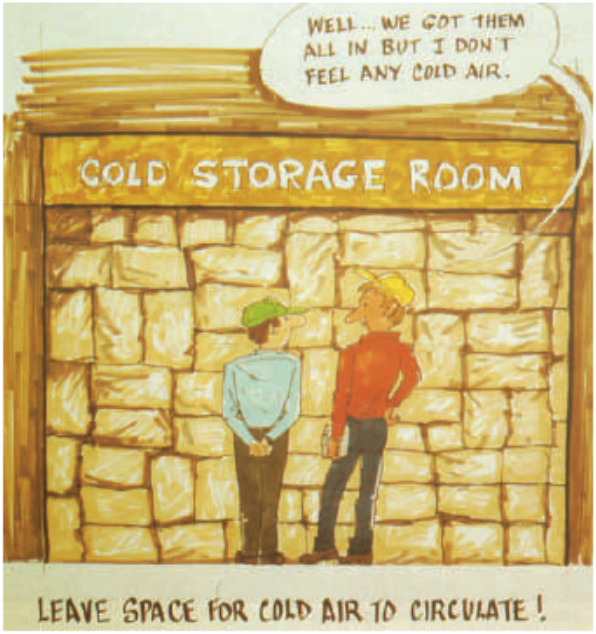
Long-term Storage of Bareroot Loblolly and Container Longleaf – Unexpected Results!

In February of 2006, we received some container longleaf pine seedlings shipped in wax-coated boxes with a plastic liner insert. In late April 2006, we picked up several bags of bareroot loblolly pine that a nursery had leftover in their cooler. These seedlings were all stored in the Coop cooler at 34° F. The boxes and bags were stored so as to allow air movement completely around the box or bag.

Over the summer, we used both the container longleaf and bareroot loblolly for several experiments. In late August (six months after receiving the container longleaf and four months after receiving the bareroot loblolly) we decided to clean out the cooler. As we opened the bag of bareroot loblolly we were surprised to see what appeared to be "good" seedlings. When we opened the box of container seedlings, there was some surface mold growing on the rootball, but the foliage looked surprisingly healthy.

We planted 160 seedlings of each stock type in our test area on August 27, 2006. We fully expected that going from the cooler to late summer temperature would cause most of the seedlings to die. We recorded the number of dead seedlings at one month (September 2006), two months (October 2006) and five months (January 2007). It was interesting to observe that, on several occasions, seedlings (particularly longleaf pine) would be counted as





dead but later would show signs of growth. By January, 2007, survival was 74% for container stock and 41% for bareroot stock.

There are several factors that probably attributed to seedlings surviving long-term storage. The cooler in which the seedlings were stored was a walk-in type cooler (approximately 10' wide, 15' long by 7' tall). The ability of this small cooler to rebound and hold the desired temperature is much better than the large seedling coolers at the nurseries. The temperature fluctuated very little from the 34°F. The seedlings in the box and bag were kept from drying out by keeping the box and bag tightly closed. The bareroot seedlings had been hand-lifted so there was an abundance of fibrous roots. We do not recommend six months of storage, but the results are noteworthy.

<u>Preliminary Report:</u> Testing the Effectiveness of Root Dips on the Survival of Loblolly Pine Following Desiccation.
Study I: Do these Root Dips Support the Growth of Fungi?

Root dips have been used for years in both the packing shed at the time of lifting and in the field just prior to planting. In the southern United States, the former has been the most common use of root dips. The purpose of root dips has been to coat the roots of bareroot seedlings in order to prevent desiccation from the time of packing to field planting. Historically, many materials have been used. Materials such as wet moss, a slurry of peat moss or vermiculite have been replaced with kaolin clay and super-absorbent gels including synthetic polyacrylate, polyacrylamide (PAM) and, more recently, a cornstarch-based compound. Nearly all bareroot nurseries now use either the polyacrylamide gels or clay. Customer preferences influence the type of protective root dip used by a nursery.

Pesticide Labels: shall & Must vs. should & May

Interpreting pesticide labels is not easy. Despite what we may think, EPA is very concerned that pesticide labeling clearly identifies what is required of the user to handle and apply a pesticide safely. The words "must", "shall", "do not", "should", "may" and "recommend" have caused their share of confusion. EPA has tried to provide chemical companies guidance in using mandatory and advisory language when writing labels. "Pesticide Registration (PR) Notice 2000-5" outlines these language guidelines. A copy of this document is on the Coop web site under the chemical labels page.

Mandatory statements are commonly written in imperative or directive terms. When you see words such as "shall", "must", "do this" or "do not", the user should understand that some action is required or prohibited. Failure to follow these instructions is a misuse of the product. On the other hand, advisory statements are written in descriptive or nondirective terms to provide general information in support of the mandatory statement or about the product in general. Words such as "should", "may" or "recommend", although not EPA's ideal choice of words, are considered advisory words.

Advisory statements are potentially confusing. "Phrasing advisory statements in straightforward, factual terms minimizes the possibility that they will conflict with mandatory statements. The use of certain words such as "should," "may" or "recommend" in advisory statements has the potential to lead the product user to erroneously believe that he/she must comply with such statements, when in fact such statements do not have to be followed." EPA does allow the use of such words on a label as long as they do not cause conflicting or ambiguous problems.

Let's look at some examples of the two types of language from the GoalTender® label:

"GoalTender can be applied as a preemergence application following seeding. Postemergence application should be delayed until a minimum of 5 weeks after emergence of the conifer seedling." The "should" is not mandatory language - it is advisory language. Applying GoalTender® on seedlings less than 5 weeks is not a misuse of the product.

"Do not apply more than 4 pints (2.0 lb active) of this product per broadcast acre per year." This is a mandatory statement. Applying more than 4 pints is a misuse of the product.

"GoalTender should be directed to the soil." This is an advisory statement telling you how to get the most benefit from the product. Applying GoalTender® as a foliar spray is not a misuse of the product.

In summary, words like "should" and "may" are advisory words. Not following the statement in which they are a part will not represent a misuse of the product. In general, these types of words are used to help you get the greatest benefit from the product.

The effectiveness of kaolin clay as a root dip has been well documented. However, this is not the case with the hydrogels. This fact has not altered the use of gels in the nursery. The popularity of gels is probably based upon their ease of use, cost, and the physical property of retaining many times their own weight in water. Also, nurseries that use clay use it by the "truck load" versus "pallet load" with the gels. Most nurseries have made the decision to use root dips because they feel it gives them good "insurance" against unknown factors such as length of time in the cooler or how the seedlings will be handled by the planting crew in the field. (A bit of trivia: Did you know that contact lenses are also made from polyacrylamide gels?)

The Coop has undertaken a study to test the effectiveness of several root dips on seedling survival following periods of desiccation. This study was initiated in late January, 2007. The results will be presented at the Contact Meeting in July.

We recently completed a preliminary study to determine if these gels and clay support growth of fungi. Due to some problems during the study, we are repeating this study again and will present the final data at the Contact Meeting.

We were interested in answering several questions: Do the gels and clay support growth of fungi? Do the gels and clay inhibit fungi growth? If fungi grow on the gels and clay, do they grow faster than on the control?
In this study, our treatments were nursery grade and rates of kaolin clay, two grades of polyacrylamide hydro gels and Zeba® a cornstarch-based gel. The genera of fungi used were *Pythium*, *Fusarium* and *Rhizoctonia*. Table 1 shows the particle size of the compounds used. Gel "A" had the greatest percentage of large particles. The Clay and Zeba® had the greatest percentage of fine material.

Table 1. Percentage of material passing through a 500µ and 250µ sieve

	Clay	Gel "A"	Gel "B"	Zeba®
Greater than 500µ	3.40%	60.00%	3.00%	0.00%
500µ to 250µ	16.20%	22.80%	54.20%	34.00%
Less than 250µ	80.40%	17.20%	42.80%	66.00%

A 3mm plug of each fungus was placed on water agar Petri plates that had been augmented with Clay, Gel "A", Gel "B" and Zeba® at a rate comparable to nursery use on the packing line. Water agar without any amendments was our control. Water agar is a basic media made with distilled water that supports minimal fungal growth. Each fungus was replicated 12 to 14 times on each water agar plate. The radial growth of each fungus was measured on each plate.

The fungal growth on the water agar plates amended with the Gel "A", Gel "B" and Zeba® were easy to measure; the water agar plates with the clay were much more difficult. It wasn't until three to four days into the study that a system was found to allow us to measure the growth on the clay. Therefore, for this preliminary study, the water agar plates with the clay were not included in the statistical analysis.

Table 2 shows the results for the Control, Gel "A", Gel "B" and Zeba® for the three fungi. Rhizoctonia grew the fastest on all treatments. It grew faster than the control on the Gel "A", Gel "B" and Zeba®, reaching the extremities of the plate by day 6. The control did not reach the extremities of the plate until day 8. Over the course of the study, Rhizoctonia grew equally well on Gel "A", Gel "B" and Zeba®. The growth of Fusarium and Pythium on Gel "A", Gel "B" and Zeba® did not differ from the control.

Pythium grew much slower and the rate of growth was more erratic for all treatments. Over the course of the study, Pythium did not reach the edge of the Petri plate (83 mm). However, the average radial growth of Pythium was more on the Zeba® (35.0 mm) than on the Control (14.8 mm), Gel "A" (7.5 mm), Gel "B"(11.0 mm) and Clay (14.8 mm).

The growth of all the fungi on the clay plates showed a large amount of variation among the replications. The growth was also

Table 2. Fungal growth rate per day (in mm)

		Days Following Initiation							
Fungus	**TRT**	**1**	**4**	**6**	**8**	**11**	**15**	**18**	**20**
	Control	13.1 c	13.8 b	10.9 a	5.1 a				
Rhizoctonia	Gel "A"	14.1 bc	19.7 a	5.9 b	0.0 b				
	Gel "B"	14.8 ab	19.2 a	6.2b	0.0 b				
	Zeba	15.3 a	19.3 a	5.9 b	0.0 b				
	lsd	0.81	0.71	1.20	1.60				
	Control	0.0 c	17.1 a	9.2 a	10.0 ab	3.7 a			
Fusarium	Gel "A"	8.3 b	12.4 b	8.6 a	10.2 ab	4.4 a			
	Gel "B"	9.0 b	13.2 b	9.3 a	11.7 a	2.1 b			
	Zeba	10.9 a	12.6 b	8.8 a	9.5 b	2.6 b			
	lsd	0.87	0.65	1.80	1.30	0.64			
	Control	3.1 a	1.4 b	0.3 b	0.6 b	0.0 a	0.0 a	1.2 a	0.0 a
Pythium	Gel "A"	0 b	2.5 b	0.0 b	0.0 b	0.0 a	0.0 a	0.0 b	0.0 a
	Gel "B"	0 b	1.4 b	0.4 b	0.0 b	0.8 a	0.4 a	0.7 ab	0.0 a
	Zeba	0 b	6.0 a	2.0 a	2.4 a	0.6 a	0.3 b	1.0 ab	1.1 a
	lsd	1.30	1.30	0.81	0.84	0.94	0.30	0.78	0.87

Treatments followed by the same letter for each day and for each fungus are not significantly different Duncan's MRT $\alpha = 0.05$

much slower on the clay as compared to the control or Gel "A", Gel "B" and Zeba®.

Summary:

1. We are repeating this study so as to include the clay in the statistical analysis.
2. The Clay, Gel "A", Gel "B" and Zeba® all supported fungal growth. This could have ramifications in storage or in the soil if these pathogens are present and the environmental conditions favor fungal growth.
3. The converse of #2: The Clay, Gel "A", Gel "B" and Zeba® did not inhibit fungal growth.
4. Rhizoctonia grew especially fast on the Gel "A", Gel "B" and Zeba®.
5. Pythium grew more on the Zeba® than on the Clay, Gel "A", Gel "B", or Control.

Indian Mound, Texas Fumigation Study – Year One Data

(For an earlier report of this study, please refer to the article in the Fall 2006 Newsletter entitled *Indian Mound, Texas Fumigation Study – Early First Year Data.)*

During Fall 2005, two studies were put in at Indian Mound. In **Study I** (located near the office), the following fumigation treatments were used:

1. Chloropicrin 60 (60% Chloropicrin & 40% Telone) @ 300 lbs/acre
2. Telone C35 (65% Chloropicrin & 35% Telone) 330 lbs/acre
3. PIC + (85% Chloropicrin & 15% solvent) @ 300 lbs/acre
4. MBC 70/30 (70% 98/2 MBr/Chlor. & 30% solvent) @ 350 lbs/acre
5. MBr (98/2 MBr/Chlor.) @ 350 lbs/acre
6. Basamid @ 450 lbs/acre
7. Control

Treatments #1- #4 covered three 40' riser lines and was replicated three times. The plots size for treatments #5 and #6 varied from 40' to 120' in length and was replicated four times.

In **Study II**, the following fumigation treatments were used:

1. Chloropicrin @ 150 lbs/acre
2. Chloropicrin @ 300 lbs/acre
3. Mbr 98/2 @ 350 lbs/acre
4. Control

All treatments covered three 40' riser lines and were replicated three times.

From the analysis of the mid-summer data, PIC+ showed particular promise. PIC+ contains a solvent that acts to keep the chloropicrin in the soil longer. On January 2, 2007, we returned to Texas to collect the seedling year-end data. At the time of our sample, the seedlings within the test plots had not been lateral pruned or undercut. In our analysis, we did not include root biomass because we felt our methodology for collecting the seedlings left too many roots in the soil.

Table 1 shows the seedling quality characteristics for Study I. No single treatment stands out like the PIC+ did in the mid-summer

Table 1. Study I Seedling quality characteristics

TRT	*Ht (in)*	*RCD (mm)*	*Shoot Dry Wt (gms)*	*Seedling Counts (per sq ft) and Std Error*	*Shoot Wt (per sq ft)*
Bas	10.4 ab	5.0 a	4.1 a	18.9 b (1.20)	75.0 b
Mbr	11.2 ab	5.3 a	4.5 a	21.1 ab (0.74)	92.5 a
TC35	10.5 ab	5.1 a	4.1 a	20.7 ab (0.95)	85.0 ab
CNTRL	10.2 b	5.1 a	4.2 a	20.9 ab (0.86)	85.0 ab
MBC70/30	11.3 a	5.4 a	4.6 a	19.5 ab (1.09)	90.0 ab
C-60	11.1 ab	5.2 a	4.2 a	22.7 a (1.63)	95.0 a
PIC+	10.8 ab	5.0 a	4.0 a	22.0 ab (0.26)	87.5 ab
lsd	1.2	0.5	0.8	3.8	19.5

Within columns, means followed by same letter are not significantly different at 0.05 level.

Table 2. Study I Soil Fungi and *Trichoderma* data

TRT	*Total Count*	*Percent Trichoderma*
Bas	64.3 c	15.5 e
Mbr	66.2 c	23.6 d
TC35	160.5 a	49.5 b
CNTRL	68.3 c	24.8 d
MBC70/30	78.4 c	46.1 bc
C-60	127.8 b	64.3 a
PIC+	180.7 a	40.6 c
lsd	44.5	11.6

Within columns, means followed by same letter are not significantly different at 0.05 level. Total Count are the number of Colony forming units per Petri plate. Percent *Trichoderma* is percentage of total colonies that were *Trichoderma*.

Table 3. Study II Seedling quality characteristics

TRT	*Ht (in)*	*RCD (mm)*	*Shoot Dry Wt (gms)*	*Seedling Counts (per sq ft)*	*Shoot Wt (per sq ft)*
CNTRL	10.4 a	5.2 a	4.3 a	18.0 a	77.5 a
Ch150	10.7 a	5.5 a	4.7 a	16.0 a	72.5 a
MBr	10.7 a	5.2 a	4.4 a	18.0 a	80.0 a
Ch300	11.0 a	5.5 a	5.3 a	15.9 a	82.5 a
lsd	2.1	1.0	1.8	5.4	30.9

Within columns, means followed by same letter are not significantly different at 0.05 level.

Table 4. Study II Soil Fungi and Trichoderma data

TRT	*Total Count*	*Percent Trichoderma*
CNTRL	143.6 a	12.0 d
Ch150	162.9 a	50.9 b
MBr	113.3 b	29.9 c
Ch300	149.3 a	60.2 a
lsd	55.5	12.9

Within columns, means followed by same letter are not significantly different at 0.05 level. Total Count are the number of Colony forming units per Petri plate. Percent *Trichoderma* is percentage of total colonies that were *Trichoderma*.

collection. This is confirmed in Figure 1. Nearly all treatments had the same number of Grade 1 (>4.7 mm) and Grade 2 (>3.2 mm) seedlings. There were relatively few culls in the seedlings collected. There was one interesting observation that we made as we examined the data. As most of you know, seedling counts to determine density can be variable. The PIC+ counts showed little variation both within the plots and between the replications. This fact is indicated by a very low standard error term for PIC + (0.26) as compared to the other treatments (Table 1).

The effect of soil fumigants on soil fungi, especially the beneficial fungus *Trichoderma*, is shown in Table 2. As has been shown in numerous other Coop fumigation studies, Basamid significantly inhibits the recovery of *Trichoderma*. It is interesting to note that fumigants containing Chloropicrin had significantly more *Trichoderma* than the methyl bromide treatment.

The seedling quality data for Study II is shown in Table 3. There were no significant differences among the fumigants and the control. The stand densities measured in this study were much lower than the target of 24 seedlings per square foot. The densities were lower than in Study I. The effect of these low densities can be seen in Figure 2. There was a much higher percentage of Grade 1 (>4.7 mm) seedlings in Study II than in Study I. The lower stand densities probably account for these differences. There were also relatively few culls in Study II.

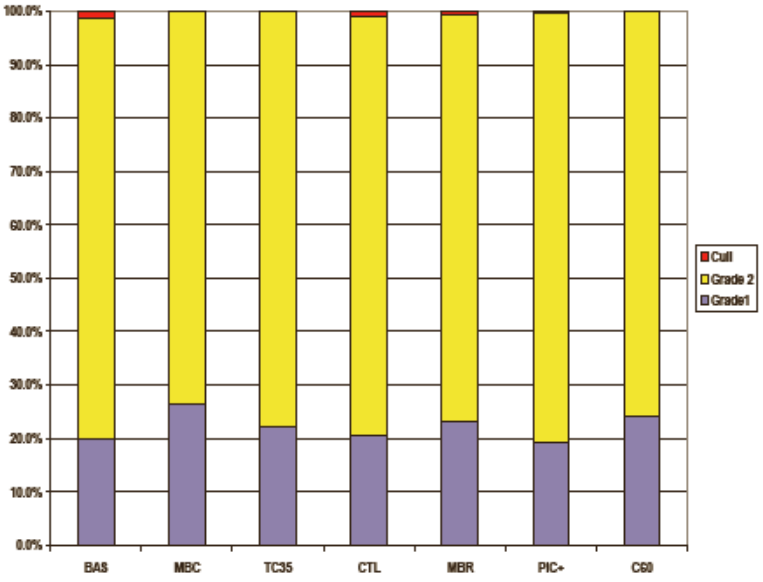


Figure 1. Grade 1, Grade 2 and Cull seedlings from Study I-Texas

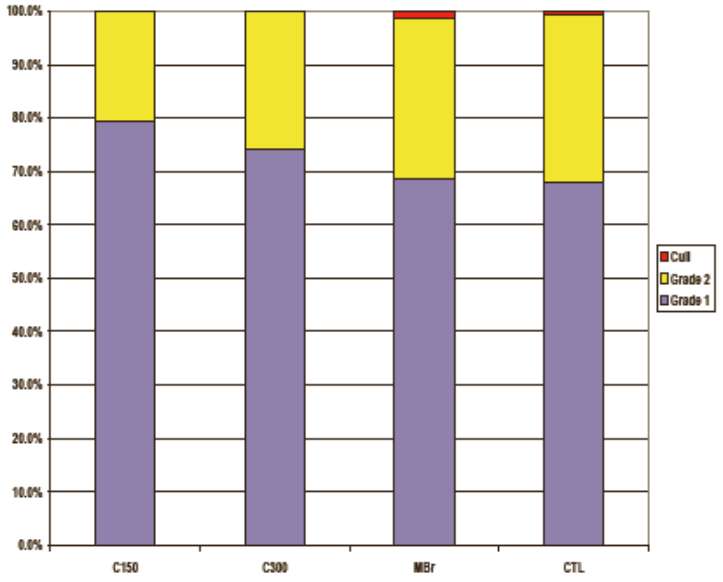


Figure 2. Grade 1, Grade 2 and Cull seedlings from Study II-Texas

Nursery Spotlight

Nursery name Garland Gray Forestry Center	**Avg. # of seedlings produced each year** 35 million	**Target average height for your primary species** 8-9" tall
Location Courtland, Virginia	**Species grown (in qty. order)** Loblolly Virginia, Shortleaf	**Target plantable seedling density** **(How many seedlings do you want per sq. ft.?)** 25
Owner Virginia Dept. of Forestry	**Normal rotation** None	**Do you top prune?** Yes
First year of production 1984	**Average % organic matter** 3%	**Approximately how many times do you top prune?** 3 times/year
Previous nursery ownership None	**Average soil composition** 94% sand	**Fall or spring fumigation** Spring
Nursery manager/Unit leader Dwight Stallard	**Normal lifting season begin date** January	**Approximate 1st sowing date** Last week in April
Number of full time staff 5	**Biggest non-biological problem** Our window of lifting and shipping the crop is narrow and planting crews can be late getting into the state	**What makes your nursery or how you handle your seedlings unique?** *"We focus on producing seedlings that are best suited for survival and growth in the state of Virginia. All cultural practices used are based on decades of research, all conducted within the state. Virginia is a unique loblolly area due to the northern location within the species range. We strive to minimize exposure to the seedlings so that freshness is maintained and everything we do is based on that philosophy. Our northern location helps tremendously with dormancy of the seedlings and maintaining high organic matter in the fields."*
Avg. # of acres in production 45 acres	**Biggest biological problem** Controlling yellow nutsedge	

Loblolly pine in Canada?

I received an inquiry the other day from a homeowner in Birmingham, Alabama. The 15-foot tall pines in their yard were dead and although several people had looked for a reason, none could explain why the eastern white pines had died. The trees were planted south of their natural range and the owner did not know if the seed source was from Tennessee or from Maine. Perhaps it was a northern seed source that does not tolerate drought and high nighttime temperatures. The southern boundary for white pine might be slowly moving north. The National Arbor Day Association (NADA) believes this to be true since they recently moved all plant hardiness zones north (in some cases more than 80 miles north). NADA no longer lists eastern white pine as suitable in the panhandle of Florida.

Hardiness zones are based on average annual low temperatures and are listed in 10 degree increments. The average low temperatures for northern Maine (Zone 3) are -40 to -30 degrees Fahrenheit, while the lows for south Texas (Zone 9) are +20 to +30 degrees Fahrenheit. The USDA hardiness zones were published in 1990 and last year the NADA developed new hardiness zones based on a 15-year temperature average (1991-2005). The USDA has not changed their hardiness zones but the NADA made new zones to provide "up-to-date information." They are predicting the minimum temperatures for the next 15 years will fit better with their new map than with the 1990 USDA map. They believe the new NADA map will "help people select the right trees to plant where they live." In most cases, the new map will encourage people to plant trees further north.

Making a new hardiness zone map will not have an effect on seedling survival but using a new map as justifying planting trees further north could affect survival. If homeowners now plant southern pines far north of their natural range (due to the new map), the chance of freeze injury will increase. For example, in 1977 a 30-yr old stand near Champaign, Illinois, suffered near complete mortality when temperatures dropped to -13 degrees (Gilmore 1980). Just because the average minimum temperature in parts of southern Illinois was 0 degrees F (over a 15-yr period), this does not mean a sudden freeze of -13 degrees F will not kill loblolly pine. In fact, when warm winters result in declamation of pines, the chance of freeze injury increases (even when planted within the local seed zone).

It is important to point out that hardiness zones are not the same as seed zones. Although the NADA web page (www.arborday.org) indicates that loblolly pine is "right" for the new NADA Zone 6, this zone is completely north of the natural range of loblolly pine. In fact, the NADA Zone 6 borders British Columbia and Ontario, Canada! Expecting southern pine seedlings to live for 50 years in Creston, British Columbia (just north of Idaho) or Niagara Falls, Ontario is not very wise.

We wonder if homeowners in Ann Arbor, Michigan will someday call to ask why the loblolly pine seedlings in their yard died. When establishing southern pine plantations, we suggest following the guidelines in the publication "Southern Pine Seed Sources" by R.C. Schmidtling. Be sure to use Schmidtling's maps as a guide. To avoid killer freezes, avoid planting southern pines more than one-half of a USDA Hardiness Zone north of the average minimum temperature isobar for the original seed source. Planting southern pine seedlings in northeast Washington and central Michigan (new Zone 6) is not very wise. -- DS

The effect of soil fumigants on soil fungi, especially the beneficial fungus *Trichoderma*, for Study II is shown in Table 4. Methyl bromide had significantly fewer total fungi than the other fumigants. It is also interesting that in Study II, as in Study I, the levels of Trichoderma were higher in the chloropicrin treatments than the methyl bromide.

Summary: Although no single fumigation treatment stood out, PIC + still warrants further examination. We see no reason to further test Basamid. As we look for alternatives to methyl bromide, chloropicrin still seems to offer the best options.

Leadership Development

Listening is an important communicative skill that many of us have never properly learned. We probably spend 50% more time each day listening than we do talking. But, how well do we listen? If you really want to know, just ask your spouse or close friend. On second thought, just continue reading this article.

When you learn how to listen properly you will be surprised at what you can learn! Larry King once said *"I remind myself each morning that nothing I say today will teach me anything. So, if I am going to learn, I must do it by listening."*

An article from the web site http://www.warrenshepell.com challenges us to take a look at our own listening habits to see if we can identify ourselves in one or more of these illustrations.

The Biased Listener: The biased listener isn't listening. He has tuned you out and is planning what to say next, based on some fixed idea he has already decided regarding the topic at hand.

The Distracted Listener: All of us fit into this category at one time or another. Distracted listeners allow internal or external distractions to prevent them from giving others their undivided attention.

The Impatient Listener: The impatient listener is one who interrupts and seldom lets people finish what they have to say. It can be easy to slip into this habit.

The Passive Listener: The passive listener does not realize that listening is an active process. When we are engaged in conversation with this type of listener, we are never sure if our message is understood. Why? Simply because we receive little or no feedback.

Tips for Sending Seedling Samples for Disease Identification

Here are some guidelines that will help you if you need to send Tom or Scott some samples for disease or insect identification:

1. Get in contact with Tom or Scott to let them know you are sending samples for identification. Since we may be out of the office when your samples arrive, be sure that you have spoken with one of us personally before sending the samples. We can arrange for the samples to be properly cared for until we return.
2. Send plenty of material. When possible, send in the whole plant.
3. Always send healthy seedlings along with seedlings at various stages of decline (healthy to very sick).
4. Collect fresh samples and mail ASAP. Avoid mailing close to a weekend or holiday when the samples may sit in a hot truck or mail room.
5. Place the seedlings in between dry paper towels in a plastic bag.
6. When possible, send some digital photos of the problem. We are interested in where the problem is in the field as well as close-up shots to show any patterns.
7. Give us some facts such as, "when did you first see the problem? did you notice any patterns? could pesticides be the culprit? anything unusual with rainfall or irrigation?" In general, any information you think would help us.
8. If you send insects, send them in a 35 mm film canister or a small Tupperware container so they won't get crushed.
9. Mail the specimens in a sturdy container so they will not get crushed.

A telephone conversation with a passive listener is very frustrating. "Hello, are you still there?"

Here are a few suggestions on becoming a good listener:

1. Do not interrupt when someone is speaking to you.
2. Squarely face the other person (turn away from the computer or TV).
3. Make eye contact. (No need to stare, but let the other person know they have your attention.)
4. Focus on what the other person is saying. Learn to listen with your eyes as well as your ears.
5. Provide appropriate and timely feedback. (Let them know you are still breathing!)

20 Years Ago . . .

What were the concerns of the Forest Nursery Management Coop in the Spring 1987 Newsletter?

This was the first issue of the Newsletter and the Director at that time was Dr. David South. Other staff members included Drs. John Blake, Walt Kelly, and Harry Larsen, Mr. Jim Boyer, Dan Land and Bobby Childree. Topics of interest were "3000 gal of Cobra available for nurseries to try"; "Tests with Chlorimuron and Pyridate for control of nutsedge"; "Nutsedge control using EPTC, Goal, Cobra and Reflex"; "Weekly vs monthly applications of Goal"; "Bayleton registered as a seed treatment by Mobay Corp."; "Update on 'Bushy-Top' Control"; "Date of sowing affects height growth"; "Terra – a computer database is available for nurseries to try", "Soil stabilizers – Geotech recommendations"; "Sulfur deficiencies"; "Weed seed in irrigation water"; "1987 Advisory and Contact Meeting to be held the week of September 21st in Tyler, TX."

Nursery Technology 101

Should I spray before or after a rain?

Spring and summertime showers can be a welcome surprise or a frustrating nightmare. Since showers can pop up very unexpectedly, you may have wondered, "Should I spray a fungicide or insecticide before or after a rain?"

There is no "cut & dry" answer for this question. With fungicides, it is important to know if your fungicide is a protectant or a systemic. Some fungicides (systemics in general) have a limited ability to stop a fungal spore growth in the plant once it is established. However, some fungicides act as a protectant. That is, it protects the plant by stopping the fungal spore from germinating in the first place. To act as a protectant, a fungicide must be on the plant before a rain can activate the fungal spore. Therefore, if a fungicide needs to be applied, and the question becomes "Should I spray fungicide X before or after the expected rain this afternoon?", the answer should be, "before the rain." Be sure that sufficient time has elapsed for the fungicide to thoroughly dry on the leaf surface.

Recommendations on how long a fungicide needs to dry can be found on the label or product web site. I always tried to allow two times the recommended time so that I could sleep soundly at night and not have to worry about the product washing off. Some products have been reformulated to resist wash off due to rain

For some crops, such as apples or potatoes, growers do not have the luxury of waiting for an extended dry period and must instead spray between showers or take a chance of losing their crop. In the pine seedling business, the fungi which concern us are not as potentially damaging as those in other crops. If you follow a regular spray schedule, you can normally manage sudden rainfalls (especially if applying systemic fungicides).

The recommendations on spraying an insecticide are different. If you have scouted your crop and know you need to apply an insecticide, it is better to wait until after a rain. Most insecticides are not rainfast. Apply your insecticide as soon as possible following a rain. If you can wait until the foliage dries, do so. Remember that excessive moisture on the plant may dilute your pesticide.