Southern Forest
Nursery Management Cooperative

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Director's Report

Another summer and growing season has quickly gone past again this year. I hope that your seedling crop is coming along and that all the seedlings in the ground are spoken for. The summer at Auburn was much calmer this year than last as we had no building move and Tom Starkey was finally on board to help spread out the workload and help with the Contact Meeting. We continue to work on the MBr issue (both CUE and QPS), re-registration of pesticides, and the evaluation of alternative fumigants, fungicides and herbicides. Many of these topics are discussed in more detail within the newsletter, along with two new sections: "Leadership Development" and "Nursery Technology 101".

Membership As of this writing, the Nursery Cooperative has 19 members. There has been some discussion with Philip Wilson concerning the Mississippi Forestry Commission shutting down their reforestation program, but they have been given a 2-year window to continue producing seedlings. Woodland Specialists has indicated to me that they will not be joining the Nursery Cooperative for the 2007 fiscal year. In late June, Tom Starkey and I met with John Pait of CellFor and discussed membership with him. Like last year, they are still considering membership at the Associate Level but have yet to make a commitment.

Advisory Meeting The Advisory Meeting is scheduled for Wednesday and Thursday, November 1 & 2, 2006 in Auburn at the School of Forestry and Wildlife Sciences Building. We will set up the meeting using video conferencing for those who may not want 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 we look forward to seeing you all soon..

Contact Meeting The 2006 Contact Meeting was held in conjunction with the Southern Forest Nursery Association's Biennial Conference in Tyler, Texas. We had about 40 members attend the Coop's portion of the meeting and toured the Indian Mound Nursery where some MBr alternative trials had been installed in November 2005. While the plots didn't appear to have much going on, seedling data collected from the plots in July is presented by Tom Starkey later in this newsletter.

The 2007 Nursery Cooperative Contact meeting is tentatively scheduled for the week of July 9, 2007 in Jekyll Island, GA. We are working with the local hotels and 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.

Pesticide News

MBr Issues The 2008 CUE application for MBr was prepared and submitted to the Environmental Protection Agency on July 10, 2006. Currently, EPA is compiling the data from each of the CUE applications by user group and will put together a CUE package that will be presented at the Meeting of the Parties in New Delhi, India on October 30 through November 3, 2006. When that information becomes available to me, I will pass it on to the Advisory and Contact members.

There is still no final ruling on the 2007 CUE. The proposed rule was open for comments until August 21, 2006. The Nursery Cooperative filed a letter on behalf of its members that addressed two issues. EPA has specifically requested information concerning the allocation of MBr for 2007 from existing stocks, either 1,621,702 kg or 1,936,302 kg, with the remaining allocation either imported or from new production. We of the SFNMC believe that the increased cost of CUE MBr is directly due to the increased reliance and use of MBr stocks that both MeBTOC and EPA require growers to use. Simple economics is occurring with the supply and demand curves moving; as the supply of MBr goes down without a corresponding reduction in MBr demand (or use), the price goes up. Continued use of MBr stocks will only make matters worse for forest nursery seedlings. Thus, we requested that 1) EPA limit the use of MBr stocks to the lower amount (1,621,702 kilograms) for the 2007 CUE and, 2) for the 2008 CUE, that the EPA and the Department of State do everything in their power to limit MeBTOC's requirements to use MBr stocks as part of the CUE allocation process to Critical Users in the United States. By maintaining MBr stocks, we believe that the cost of MBr will stabilize and remain affordable for its continued use in the production of forest nursery seedlings while we continue to search for and identify an economical and viable alternative to MBr.

QPS As a reminder, the other source of MBr for forest tree nurseries is the use of quarantine pre-shipment (QPS) MBr. As you all know, forest tree nurseries have inter-state use of QPS. As long as seedlings are being shipped across state borders, nurseries can fumigate nursery soils with MBr to produce those seedlings.

In March of 2006, only Alabama and Mississippi had rules in place that allowed the use of both inter- and intra-state QPS. Since our last Newsletter, considerable progress has been made with respect to the other southern plant boards and intra-state QPS.

We are pleased with the response we have received from the various State Plant Protection Boards. Below is a table that summarizes where we stand on each state:

State	Status	Comments
AL	Finalized 3/14/06	
AR	Fall 2006 est.	Plant Protection Board met to make proposal 9/29/06
GA	Finalized 10/3/06	
LA	9/20/06 – start of 30 day comment period	Law should be effective 1/20/07
MS	Finalized 3/3/05	
NC	Promising	Greg Pate (NCDFR) will be making contact
OK	Fall 2006 est.	Nursery people making recommendations to Plant Protection Board
SC	??	Working with the state – slow going
TN	??	John Conn spoke with Director about a month ago, he is aware of need.
TX	Finalized 9/22/06	
VA	??	"Does not seem to be a major issue in the state." Need more "squeaky wheels" in the state.

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.

EPA Rulings The Nursery Cooperative has spent over a million dollars and thousands of hours looking for a replacement for MBr. While we have yet to identify a perfect MBr alternative, there are some treatments nursery producers could live with. Ask yourself, "If Bayleton were to disappear tomorrow, what would I use to control fusiform rust?" Bayleton, in my opinion, is **THE** most important pesticide in the production of forest tree seedlings in the southern United States. In May 2006, Bayleton (triadimefon) was up for re-registration as part of the Food Quality and Protection Act (FQPA). This on-going examination of all pesticides labeled for use in the United States has consumed a lot of my time and efforts at Auburn. With respect to Bayleton, some of the early "concerns" from EPA and BayerCrop Science was "worker protection" and this was evident in the questions that were being asked of me with respect to forest tree nurseries. I cannot thank you enough, nor stress how important your responses to my questions helped formulate EPA's risk assessment. For a brief time, nurseries and pine seed teetered on the edge of the "risk-cup" with respect to keeping Bayleton labeled for rust control. In late July, I was informed by BayerCrop Science that "EPA had softened their concern about pine seed and that pine nurseries would remain on the label". Forest tree nurseries was only 1 of 3 agronomic crops that remained, with all other agronomic uses phased out by the end of 2007. Thus, forest tree nurseries have retained another useful tool in their arsenal to produce disease-free seedlings for reforestation. Although Bayleton's future appears to be safe, we of the Nursery Cooperative are making a concerted effort to locate another rust control fungicide. What would you use to control rust if Bayleton were not available? More on rust control later in this issue...

TREE SEEDLING QUALITY AND WEED CONTROL WITH BASAMID, MBR AND METHYL IODIDE – GLENNVILLE, GA YEAR 2

Tom Starkey

In November 2004 and April 2006, Bill Carey, Steve Godbehere (Hendrix & Dail), Bill Isaacs (SouthPine/Certis) and Dean McGraw (Rayonier) established a 9 section fumigation trial to look at fumigants over a two-year rotation. Most of Bill's notes concerning the experiment were lost/destroyed in the accident. Scott, however, using photographs recovered from his camera, email messages from his computer, and history plot data collected from Glennville, was able to reconstruct the plots, rates and species used in the trial.

This report examines the first year seedling data and two years of data for soil fungi. For information on the fumigation levels and plot design, see the Spring 2005 Newsletter, pp 3-4.

First year seedling crop indicated that MI was as good as MBr in producing seedlings with similar RCD, heights and densities for both loblolly and slash pine (Table 1). However, 2005 weed control, as measured by time of weeding and biomass, was significantly more in the MI than in the Basamid and MBr plots. There were no significant differences in weeds or time in 2006 (Table 2). Basamid plots had smaller RCDs, fewer seedlings per sq. foot and were shorter than either MBr or MI. These seedlings never attained a height to require top-pruning during 2005. Observations during August 2006 indicate that seedlings growing in Basamid were smaller than other treatments and the number of seedlings that were pruned was small. Pruning is an important cultural practice widely used by nurseries to increase the number of quality seedlings for shipping and increase survival of outplanted seedlings.

Nursery Management & Production

If you are growing container trees, you need a subscription to *Nursery Management & Production*, published by Branch-Smith Publishing. *The best part is that it is free!* It is oriented toward horticultural nurseries but is full of good articles on pesticides, soil mixes, diseases, insects, irrigation, etc. Here is how you get it: Go to www.GreenBeam.com. Click on the magazine titled Nursery Management & Production in the green bar. On the next screen, click on the link for "new subscription". Fill out the on-line questionnaire. HINT: When it asks for growing area, include the total area for your container and bareroot production. For total sales volume – use an estimate for the whole nursery.

Twelve months after fumigation with Basamid, *Trichoderma* within the plots were significantly reduced in propagules per gram of soil (Table 3). Eighteen months following Basamid fumigation, the total number of fungal propagules per gram of soil increased (Table 3). However, the Basamid plots still had significantly fewer *Trichoderma* colonies than either MI or MBr (Table 4). *Trichoderma* is a beneficial soil fungal genus that is found in nearly all agricultural soils. Fungi in this genus have been utilized for years as a bio-control for plant diseases and *Trichoderma* has also been shown to increase germination and promote growth in plants.

Key Study Summary Points:

- Methyl Iodide fumigation produced industry-standard seedlings when compared to Methyl Bromide.
- Methyl Iodide fumigation had more weeds than either Methyl Bromide or Basamid.
- The high weed count in Methyl Iodide plots may be due to the relatively low rate: 150 lbs/acre of fumigant used.
- Basamid fumigation had fewer and smaller seedlings than either Methyl Bromide or Methyl Iodide.
- After 12 and 18 months following fumigation, levels of *Trichoderma* in the soil were significantly lower in Basamid plots than either the Methyl Bromide or Methyl Iodide plots.
- VIF tarping significantly reduced fungal colonies than HD at the second sampling period.
- There were no significant differences between HD and VIF related to fungal genera recovered on selective media.
- VIF tarping of MBr at 150 lbs/acre produced seedlings similar to the 300 lbs/acre MBr under HD plastic.
- There is still no operational method for using VIF in broadcast (flat tarp) systems as used in forest tree nurseries.

Table 1. Seedling characteristics by species and soil fumigant - 2005 - Glennville, GA.

	Loblolly Pine		
	MB [1]	MI	BAS
Density (ft^2)	21.6	22.9	20.3
RCD (mm)	4.9 a	4.7 a	4.3 b
Height (in)	12.6 a	12.2 a	9.3 b
Root (g)	0.65	0.65	0.61
Shoot (g)	4.3 a	4.2 a	3.3 b
	Slash Pine		
	MB [1]	MI	BAS
Density (ft^2)	20.6	20.0	18.5
RCD (mm)	5.3	5.2	5.4
Height (in)	12.0 a	12.0 a	10.7 b
Root (g)	0.64	0.66	0.78
Shoot (g)	5.0 a	5.3 a	5.9 b

[1]Letters within a row and species indicate significant differences at the 0.05 level.

Table 2. Hand weeding time and weed biomass by soil fumigant - 2005 and 2006 - Glennville, GA.

		Fumigation		
Year	Weeds	MB [1]	MI	BAS
2005	Weight (g/riser)[2]	14.0 a	20.9 b	12.0 a
2005	Time (seconds/riser)	35.2 a	59.3 b	39.1 a
2006	Weight (g/riser)[2]	86.7 a	169.7 a	133.4 a
2006	Time (seconds/riser)	60.3 a	61.2 a	60.7 a

[1] Letters within a row indicate significant differences at the 0.05 level.
[2] Riser = sections between sprinkler heads.

Table 3. Soil-borne fungi populations by soil fumigant – 2005 and 2006 - Glennville, GA.

Fumigant	# of *Trichoderma* Colonies - 2005 [1]	# of Fungal Colonies - *2006*[1]
MB	155.6 a	140.2 a
MI	32.6 b	106.4 b
BAS	15.3 b	142.6 b

[1] Letters within columns indicate significant differences at the 0.05 level.

Table 4. Soil-borne fungi populations by soil fumigant - 2006 - Glennville, GA.

Fumigant	*Penicillium* sp. [1]	*Trichoderma* sp.	Other	Total
MB	12.8 [2] a	6.2 a	1.0 a	19.9 a
MI	10.9 b	9.0 a	1.2 a	21.1 a
BAS	13.0 a	1.3 b	1.2 a	15.5 b

[1] Letters within a column indicate significant differences at the 0.05 level.
[2] Data represents average number of dilutions on a plate with fungal genera.

Indian Mound, Texas Fumigation Study – Early First Year Data

Tom Starkey

At our Contact Meeting in Texas, many of you had the opportunity to examine the fumigation studies at the TFS Indian Mound Nursery. Scott, Tommy and I went out to the nursery early Monday morning to flag the different trials for the tours. If you had been there when we were setting out the flags, you would have heard a number of "Wow!"s. One particular treatment in the study really stood out!

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

1. Chloropicrin 60 (60% Chloropicrin & 40% Telone) @ 300 lbs/acre
2. Telone C35 (65% Chloropicrin 35% Telone) @ 330 lbs/acre
3. PIC + (85% Chloropicrin and 25% solvent) @300 lbs/acre
4. MBC 70/30 (70% 98/2 MBr/Chl & 30% solvent) @ 350 lbs/acre
5. MBr (98/2 MBr/Chl) @ 350 lbs/acre
6. Basamid @ 450 lbs/acre
7. Control

All treatments covered three 40' riser lines. The first four treatments were replicated three times and the last two treatments were 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 one 40' riser line and were replicated three times.

While we were in Texas, we collected mid-season data including heights, RCD, seedling counts and dry weights.

As you can see in Study I, the PIC+ was especially strong. If you are considering some fumigation trials for this coming year, you may want to consider this one. The solvent in this compound acts to keep the Chloropicrin in the soil longer. We will be collecting fall seedling data from these studies. This data, plus the initial 2007 sowing data, will be presented at the 2007 Contact Meeting. If you are interested in seeing the fall data, give us a call after the first of the year.

The following two tables provide a summary of the data:

Study I

TRT	*Height (in)*	*RCD (mm)*	*Total Dry Wt (gms)*	*Seedling Counts (per sq ft)*
Bas	5.71 a	2.36 a	22.15 a	14.94 b
MBr	6.19 b	2.50 bc	22.96 a	16.56 b
TC35	6.30 b	2.49 bc	25.13 ab	15.04 b
CNTRL	6.31 b	2.41 ab	21.82 a	10.42 a
MBC	6.46 b	2.57 c	25.61 ab	14.29 b
C-60	6.83 c	2.70 d	30.74 c	14.71 b
PIC+	7.50 d	2.76 d	31.96 c	17.88 b

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

Study II

TRT	*Height (in)*	*RCD (mm)*	*Total Dry Wt (gms)*	*Seedling Counts (per sq ft)*
CNTRL	5.02 a	2.45 a	18.16 a	13.13 a
Ch150	5.89 b	2.42 a	26.33 b	12.75 a
MBr	6.74 c	2.65 b	32.43 bc	15.71 a
Ch300	7.18 d	2.72 b	34.14 c	12.05 a

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

"Please bring me the cuchillo..."

No, we're not at the local Mexican restaurant... Are you frustrated over your inability to communicate with your Spanish speaking workers? Remember, just because they shake their head in agreement with you does not mean they fully understand what you intended to communicate. There is a good agricultural dictionary available from: www.agbook.com. The title is "**THOMSON'S SPANISH-ENGLISH - ENGLISH-SPANISH ILLUSTRATED AGRICULTURAL DICTIONARY**" by Dr. Robert P. Price, Jr. This is a hands-on book of English to Spanish and Spanish to English *devoted strictly to agricultural terms*. Agricultural, botanical, horticultural, livestock, equipment, tools, weeds, diseases and insects are all listed. Also, a portion of the book is illustrated with English and Spanish terminology. Designed to be used on a daily basis. Paper bound. 160 pg. $27.95. This publisher also has a bilingual book on Farm Safety.

Bayleton Alternative Study

Tom Starkey

If I were to ask you "What is the single most important chemical that you use your nursery? If you didn't have this chemical, you could not grow trees..." What would your answer be? If Methyl Bromide was your answer – you are wrong. If Goal was your answer – strike two. What would your loblolly seedlings look like without Bayleton? How much of a market is there for seedlings with knots on the stems? Can you name an alternative for Bayleton? We have not fully appreciated the importance of Bayleton in our arsenal of chemicals. With this report, the Coop will continue a series of tests to find a replacement for Bayleton.

In March 2006, we began a study to evaluate three potential chemicals for control of Fusiform rust caused by the fungus *Cronartium quercuum* f. sp. *fusiforme*. The chemicals were Heritage® (azoxystrobin), Medallion® (fludioxonil) and Folicur 3.6 F® (tebuconazole) as both a seed treatment and foliar spray. Bayleton DF® (triadimefon) and a non-treated control were used for comparison.

Foliar Application

Loblolly pine seed were stratified for 4 weeks after which they were double sown to Ray-Leach containers on March 13, 2006. Containers were thinned to one seedling per container and then randomly assigned fungicidal treatments. Six replications of twenty seedlings each were considered the treatment unit. The foliar experiment contained Heritage® (azoxystrobin), Medallion® (fludioxonil) and Folicur 3.6 F® (tebuconazole) as well as a Bayleton DF® (triadimefon) check and non-treated control seedlings for both positive and negative controls. Application rates for each fungicide included the upper and lower rates recommended for other rust pathogens and are listed in Table 1. On May 1, 2006, seven weeks post sowing, seedlings were treated with the various fungicides at Auburn University's Pesticide Research Facility. After treating seedlings, they were returned to the greenhouse until inoculation.

Seed Application

Loblolly pine seed were stratified for 4 weeks after which they were then treated with the fungicides prior to sowing. On April 19, 2006, seed were treated with either Heritage® (azoxystrobin), Medallion® (fludioxonil), Folicur 3.6 F® (tebuconazole) as well as a Bayleton DF® check and non-treated seed for both positive and negative controls. Application rates for each fungicide included the upper and lower rates recommended for other rust pathogens are listed in Table 1. On April 20, treated seed were double-sown to Ray-Leach containers and then thinned to one seedling per cell as they germinated. Six replications of twenty seedlings each were considered the treatment unit.

On May 11, 2006, foliar-treated and seed-treated seedlings were transported to the USDA Rust Screening Laboratory in Asheville, North Carolina. Seedlings were allowed to acclimate to the new growing conditions for 5 days and on May 16, 2006, seedlings were challenged with 25,000 spores/ml of *Cronartium quercum f.sp. fusiforme* using their inoculation protocols. Seedlings remained under the care of the Center for the duration of the growing season. On August 10, 2006 the seedlings were examined for swellings along the main stem, which is an indication of infection. The results of this 3 month evaluation are presented in Table 2. In November 2006, a final evaluation will be made by the personnel at the Rust Screening Laboratory. After this final evaluation, the seedlings will be returned to Auburn University where height, RCD and seedling biomass will be measured.

Table 1. Foliar and seed treatment rates used in the experiment.

	Foliar Treatments		Seed Treatments	
	1x	2x	1x	2x
Heritage® azoxystrobin	11 oz / acre	22 oz / acre	2 oz / 50 lb seed	4 oz / 50 lb seed
Medallion® fludioxonil	9 oz / acre	18 oz / acre	2 oz / 50 lb seed	4 oz / 50 lb seed
Folicur 3.6 F® tebuconazole	4 fluid oz / acre	8 fluid oz / acre	200 fluid oz / 50 lbs seed	400 fluid oz / 50 lbs seed
Bayleton DF® triadimefon	4 oz / acre	-	2 oz / 50 lb seed	-

Table 2. Seedling infection as measured by percentage of trees with galls at 3 months

	Foliar Treatments		Seed Treatments	
	1x	2x	1x	2x
Heritage® azoxystrobin	38%	45%	18%	14%
Medallion® fludioxonil	50%	44%	35%	23%
Folicur 3.6 F® tebuconazole	45%	45%	0%	0%
Bayleton DF® triadimefon	12%		0%	
Control (non-treated)	44%		36%	

Results

Germination

The foliar application had no measurable effect on seedling quality or survival within the 3 week period post fungicide spray and inoculation with basidiospores. However, seed treatments did result in some phytotoxity with the Folicur 3.6 F® at the 2x rate, significantly slower in germination and eventually seedling mortality, over the 1x rate (91% vs 55%) of Folicur 3.6 F®.

Rust Control

None of the foliar treatments were as effective as Bayleton® in controlling infection. For the seed treatments, both Folicur 3.6 F® and Bayleton DF® provided suitable control (Table 2).

Future Investigations

To be considered as an alternative to Bayleton DF®, a chemical must show a good level of control as both a spray

Why Did They Die?

Many know about the TV show CSI... but did you know a DSI team has visited some outplanting scenes? In fact, some of our members have asked Coop staff to participate in a DSI (i.e. dead seedling investigation). In some cases, a DSI was needed when seedlings planted in the winter turned brown in March (and appeared dead). One thing you will notice about the TV show is the CSI team arrives on the scene as soon as a dead body is found. Likewise, it is very important for a DSI team to arrive on the scene while some seedlings are still green. Sending us a box of brown, dry seedlings 8 months after the trees died in March holds little hope in determining the cause of death. However, on some occasions, nursery temperature records have been invaluable to a DSI team. Since temperature records from a station just 10 miles away are often different from those at the nursery, a nursery weather station can be very helpful to both managers as well as the DSI team. In some cases, the data was helpful in determining if a deacclimation freeze took place (see the Spring 06 Newsletter).

With good temperature records, it might be possible to determine if freeze injury occurred in the nursery or in the plantation. Most weather stations have the thermometer mounted about 5 feet off the ground. However, on calm, clear nights, the temperature near the ground can be three or four degrees (F) cooler than five feet above ground. Also, some locations in the nursery may be natural frost pockets and the temperature might be 10° F colder in these areas. Therefore, it might be a good idea to have temperature recorders in several spots in the nursery (to at least understand how cold it can get at seedling level). If you would like further information on instrumentation and how to monitor the weather, contact the Coop staff. -- David South

and seed treatment. Of the chemicals tested, only Folicur® provided control as a seed treatment. It was not suitable as a spray treatment. Due to the slow germination of the Folicur® treated seed, we will re-evaluate this chemical again in the next trial.

Both Bayleton and Folicur® are in the same classification of fungicide (Conazole or Triazole) and have a similar mode of action. They are also both systemic, which is a plus especially during the rapid growth phase of a seedling when chemical coverage of new foliage may be difficult. We plan to examine other fungicides which are in the Triazole class. One such example is Dividend Extreme®. This fungicide is made up of two chemicals, one in the Triazole class and the other is Subdue®. If this chemical provides rust control, it could address two problems: as a seed treatment for fusiform rust and early season control of damping-off.

Controlling Nematodes Between Fumigation

Tom Starkey

Have you noticed a problem the second year following fumigation? Do you have to "push" those seedlings more than usual? At the recent Southern Forestry Nursery Association Biennial Conference in Tyler, Texas, Michelle Cram, a plant pathologist with the US Forest Service in Athens, Georgia, raised these questions. It struck a cord with several managers. However, when the Coop began to look to see what we could recommend to control nematodes during the second year, we realized that there are no chemicals registered for treatment over pines.

Why are nematodes "becoming" a problem during the second year? Could it be due to the decrease in the amount of methyl bromide being used? Could it be due to less than optimum environmental conditions during fumigation? Could it be due to contamination by nursery equipment? There are probably other reasons, but the bottom line is that if it is a problem you want to address, your choices after sowing are "slim to none".

In late July, the Nursery Coop, Hendrix & Dail and Dean McCraw with Rayonier put in a test at the Glennville Regeneration Center in Georgia. Three bed rows at the end of a field were designated as being second year land and exhibiting typical nematode problems. The signs of nematode infestation were severe chlorosis, stunting, poor stand development and seedling death. Our objectives in this initial study were as follows:

1. What nematicides can we apply on land currently in pine production that will not kill the pines?
2. What rate of nematicide can be used to effectively reduce the nematode populations?
3. Will the seedling quality/survival be affected as a result of the treatments?

The following treatments were used:

1. Control
2. Telone II® @ 5 gal/acre
3. Telone II® @ 7.5 gal/acre
4. Telone II® @ 10 gal/acre
5. MBC 70/30® (70% 98/2 MBr/Chl & 30% solvent) @ 50 lbs/acre ai
6. MBC 70/30® (70% 98/2 MBr/Chl & 30% solvent) @ 75 lbs/acre ai
7. MBC 70/30® (70% 98/2 MBr/Chl & 30% solvent) @ 100 lbs/acre ai

The lowest rates of both Telone® and MBC® are nematode suppression rates labeled for use injected under sod and golf courses. Each treatment consisted of 40' of bed row and treatments were replicated four times over the three bed rows. A Yetter coulter rig with five 36" coulters were used. The coulters were spaced about 12" apart and each chemical was injected to about 6" deep. Immediately following injection, a water seal was

applied by adding 3/8" of water. At dusk, an additional ¼" of water was applied. Prior to chemical application, seedling counts and seedling and soil samples were collected and returned to Auburn for analysis.

Results: None of the chemical treatments had a visible adverse effect on seedling shoots three weeks after treatment. Death of seedlings in the test plots was from either the coulters being misaligned or at the beginning of each test where the fumigant from the previous plot was "blown out and thus the rate was several times at that point".

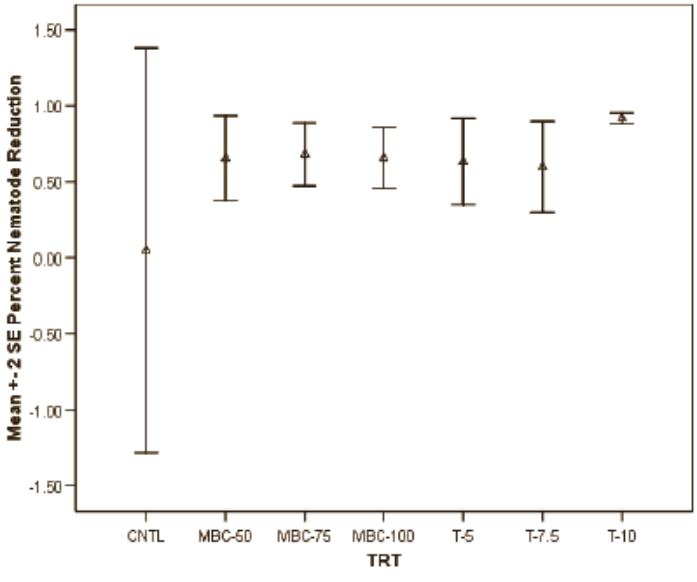
Stunt nematode was the primary nematode recovered from the soil samples. There was no clear treatment for nematode control. All treatments, with the exception of Telone II® @ 10 gal/acre, had a large variation among the replications (Figure 1) and there were no significant differences between treatments. The average pre- and post-treatment nematode levels are presented in Table 1. All treatments effectively reduced nematode levels. The variation in the control cannot be explained. In three out of the four replications in the control there was a reduction in nematode levels over time. The post treatment levels for Telone II® @ 7.5 gal/acre of 113 nematodes/100 cc soil are high due to the results from one replication. The Telone II® @ 10 gal/acre showed the least variability among replication and the greatest reduction in nematode levels. Be sure to read on before trying this on a large scale. At the time of this Newsletter, the seedling quality in the treatments still appears good.

Table 1. Average pre- and post-treatment nematode levels and percent reduction.

Treatment	Pre-Treatment	Post-Treatment	% Reduction
MBC-50	302[1]	73	65.6%
MBC-75	278	80	68.1%
MBC-100	140	37	65.6%
T II-5	160	50	63.4%
T II-7.5	381	113	59.8%
T II-10	244	20	91.8%

[1] Nematode levels recorded nematodes per 100 cc of soil.

Figure 1. Replication variation for treatments



Still to do: We will be returning to the test plots in the fall to sample nematode levels and collect seedlings to measure quality. We intend to repeat this study again in 2007.

Lessons learned: We need to be more aware of soil moisture prior to sampling. This is a variable that can have an influence on recoverable nematodes. We need more treatment replications plus more intra-plot samples because of the inherent variability of nematode populations in the soil. Our test plots must be much longer than 40'. With this method of tractor application, longer treatment plots would allow the tractor to lift the coulter blades between treatments. The 36" coulter blades are not needed in a forest tree nursery. This rig is one that was used over turf grass and golf courses. We need to fine-tune the alignment of coulter blades to avoid cutting too close to the seedlings.

Nursery Technology 101

NEW!

Question: What makes fungicides different? How do they kill a fungus?

Answer: We know that a fungicide is a chemical we apply to control fungi. But, how does this happen? We generally think that all fungicides kill the fungus, but this is not true. There are many classifications of fungicides. One system classifies fungicides as to whether they act as a protectant or as a curative fungicide.

A protectant fungicide (sometimes called a contact fungicide) is one that prevents the fungal spore from germinating or entering the plant (inhibits spore germination). A protectant will shield healthy tissue from invasion. Protectants are generally not systemic (capable of moving inside the plant), they stay where they are sprayed (PCNB, an exception, is considered to be locally systemic).

Most of the fungicides in this group act on multiple sites in the fungus metabolism to stop spore germination. These fungicides can be used all season long without fear of developing resistance.

There are several cautions you must be aware of when using a protectant fungicide. First, this type of fungicide has little or no effect on the fungus if the fungal spore has germinated and penetrated and begun to colonize (infect) the host. Second, what is not covered by the chemical when sprayed is not protected. Third, new growth is not protected unless sprayed. Forth, degradation of the chemical due to weather is a concern. And fifth, control of any root diseases can only be done if the chemical is applied as a soil drench.

Some examples of this class of fungicides are chlorothalonil (Bravo®, Daconil®), PCNB (Terraclor®), mancozeb (Dithane®, Manzate®, Protect®), etridiazol (Terrazole®), and captan (Captan®).

The curative fungicides (sometimes called systemics fungicides) can stop or inhibit the growth of a fungus once a fungal spore has germinated or once the fungus has infected the plant. Some fungicides in this group (ex. Bayleton®) can also inhibit

sporulation of the fungus, thus limiting the ability of the fungus to reproduce.

Notice that we said that Bayleton® inhibits sporulation, it does not eradicate sporulation. Therefore, it is very important that the label recommended time between sprays not be exceeded. If the recommended time is exceeded, it is possible to have sporulation at such a level that Bayleton® is not effective.

Fungicides in this group are systemic, that is, they have the ability to move through the plant following application. Not all of these fungicides move freely within the plant. Some are locally systemic, i.e. they do not move far from the point where they enter the plant. Others are upward systemic in that they move in the plant upwards through the xylem (most systemics act in this manner). Only one group of fungicides are "truly" systemic, that is, they move both up and down in the plant. The fosetyl-aluminum (Aliette®) is an example of a chemical that moves in both the xylem and phloem.

The systemic fungicide group is more likely to develop resistance in the fungi than the protectant group. Systemic fungicides generally have a single site at which they affect the fungus. The frequent use of the same systemic fungicide or another systemic fungicide that has the same mode of action can increase the probability of developing resistance in the fungus.

Some examples of systemic fungicides are iprodione (Chipco 26019®), thiophanate-methyl (Cleary's 3336®), triademefon (Bayleton®) and mefenozam (Subdue®).

There are numerous fungicides on the market that contain two or more fungicides. (Some even contain a fungicide and an insecticide.) This is done for least two reasons: Combining fungicides that have different modes of action insures better control. For example, Banrot® is a combination of a protectant and a systemic fungicide (etridiazol + thiophanate-methyl). Combining a protectant and a systemic provides more points at which the fungus can be killed or inhibited. The combination of fungicides also reduces the threat of resistance in the fungal population.

Leadership Development

NEW!

Caution – Handle With Care!
5 Negative Personalities That Can Destroy A Team

Tom Starkey

I found these 5 personalities in a leadership journal several years ago and thought they were very insightful. In case you haven't figured it out by now, the world is not perfect and you probably don't work with perfect people. You have most likely run into one of these personality types along the way. The key to survival is not ignoring them or get angry with them, but learning how to work with them.

1. The Locomotives
Favorite saying: "It's my way or the highway."
These people have a tendency to steamroll fellow teammates. They can be very intimidating. Other team members do not enjoy working on a project with them.
Strategy: Assert yourself. Tell them (in private) how this behavior is affecting the team. Explain how you want them to communicate from then on.

2. The Perfectionist
Favorite saying: "It could have been done better."
When it is not done perfectly, this personality tends to turn negative.
Strategy: Don't take their comments seriously. Their expectations are generally unrealistic. Help them set realistic expectations and goals for themselves and what they expect from others.

3. The Not-My-Jobbers
Favorite saying: "That's not in my job description."
These are the ones that refuse to pitch in and help. This may be their way of getting back at others because of how they feel they have been treated.
Strategy: They seek advancement and may feel they are on a "dead end" career path. Re-inspire them with training and development opportunities.

4. The Uncommitted
Favorite saying: "It can wait."
These people refuse to take their job seriously. Working is low priority for them. They spend time at work on personal things and other interests.
Strategy: Communicate clear goals, standards and expectations. It is especially important that you hold them accountable.

5. The Sacrificers
Favorite saying: "I've given up _____ for this company and no one cares."
These people come in early and stay late. They do anything you ask them to do, but complain about their workload or the people they have to work with.
Strategy: Offer constant positive feedback. Tell them how much you appreciate their contribution.