

Seedling Quality and Weed Control with Dazomet, Methyl Bromide and Methyl Iodide at the Glennville Regeneration Center 2005-2006

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Why is this study important?

- Coop has conducted small scale plots studies of alternatives to MBr that have included Methyl Iodide (MI).
- MI similar properties to MBr; “silver bullet” to replace MBr.
- Need large production scale plots to look at seedling characteristics, weed, insect or disease control

Methyl iodide, Iodomethane, MI

- Nursery Coop began testing this compound in 2001.
- The ease of handling a liquid (MI) over a gas (MBr) might increase worker safety and application methods.
- MI decomposes in light, thus shorter residence time in the atmosphere (a few days).
- No residue of MI remains on treated crops.
- In both laboratory and field trials, MI was equal to or better than MBr in controlling soil-borne pathogens.
- Not registered for use in the United States
- Cost of the material if produced on a larger scale is unknown.
- WAS on fast track for registration by EPA.

What went into this study?

- 3 fumigants - Basamid, MBr & MI replicated 3 times in nursery sections (9 bedrows each).
- Two plastic types; HD, VIF.
- Basamid 490 lbs/acre (Nov 2004) w water seal
- MI:ChI (98:2) 150 lbs/acre (April 2005) w VIF
- MBr:ChI (98:2) 150 lbs/acre (April 2005) w VIF
- MBr:ChI (98:2) 350 lbs/acre (April 2005) w HD
- Sown to Loblolly and Slash pine

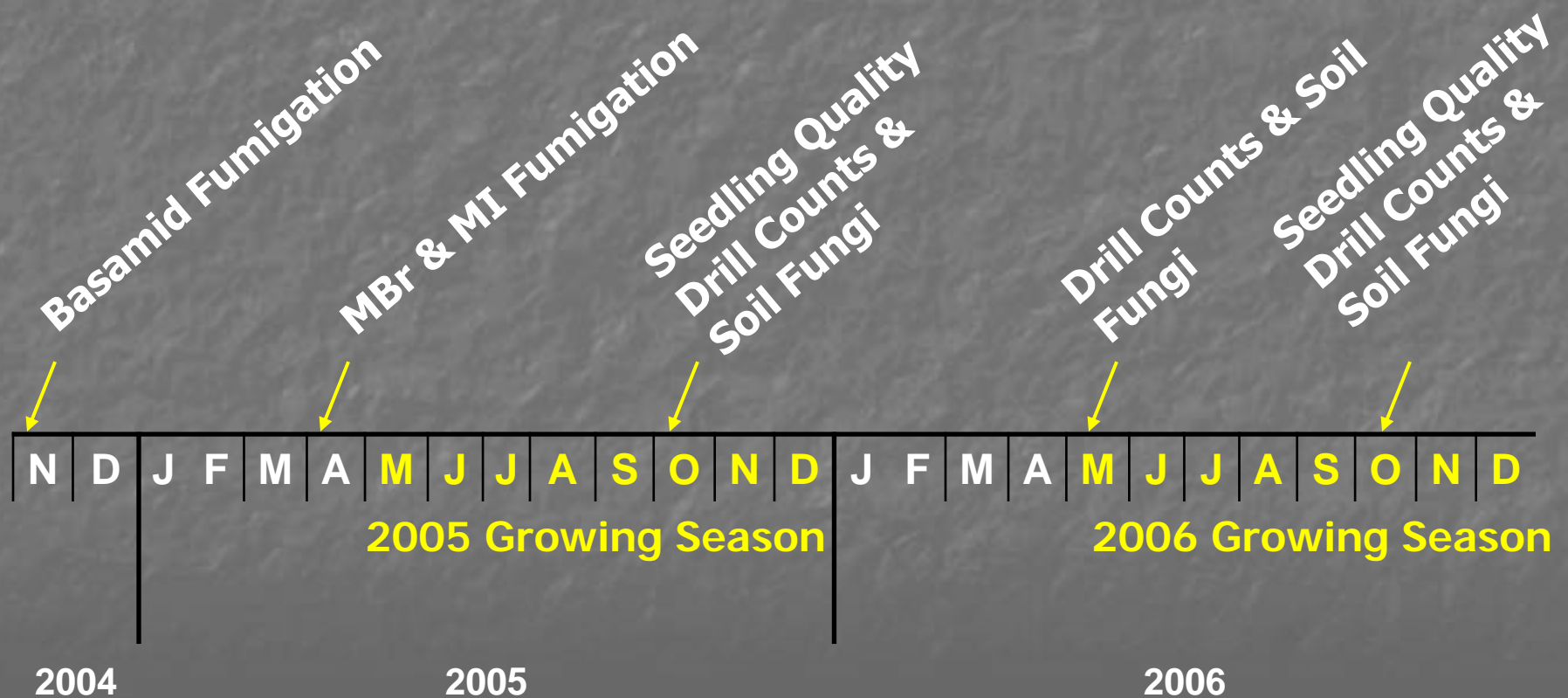
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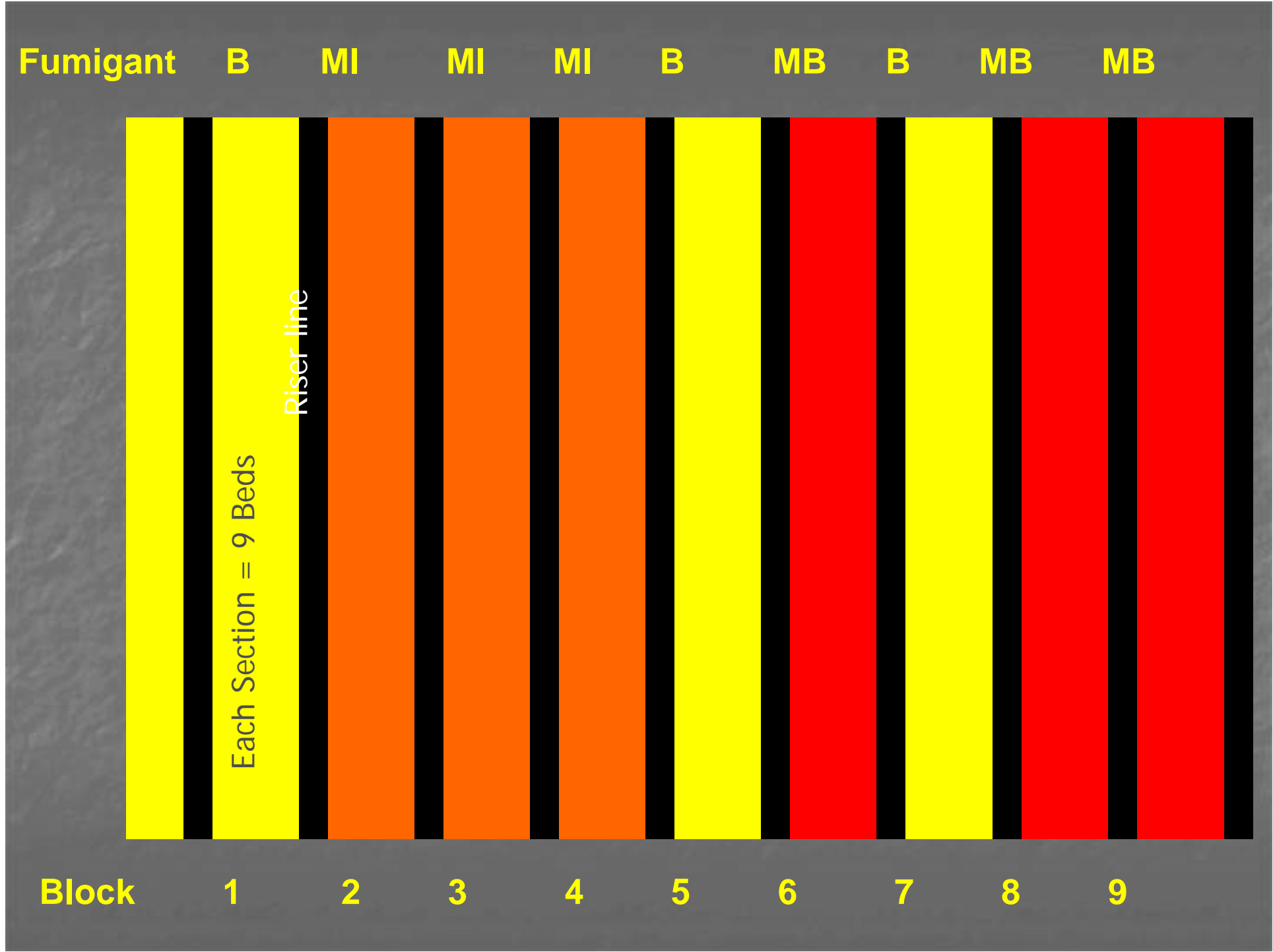
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Normal nursery practices were carried out

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Time Line of Study





Tarp

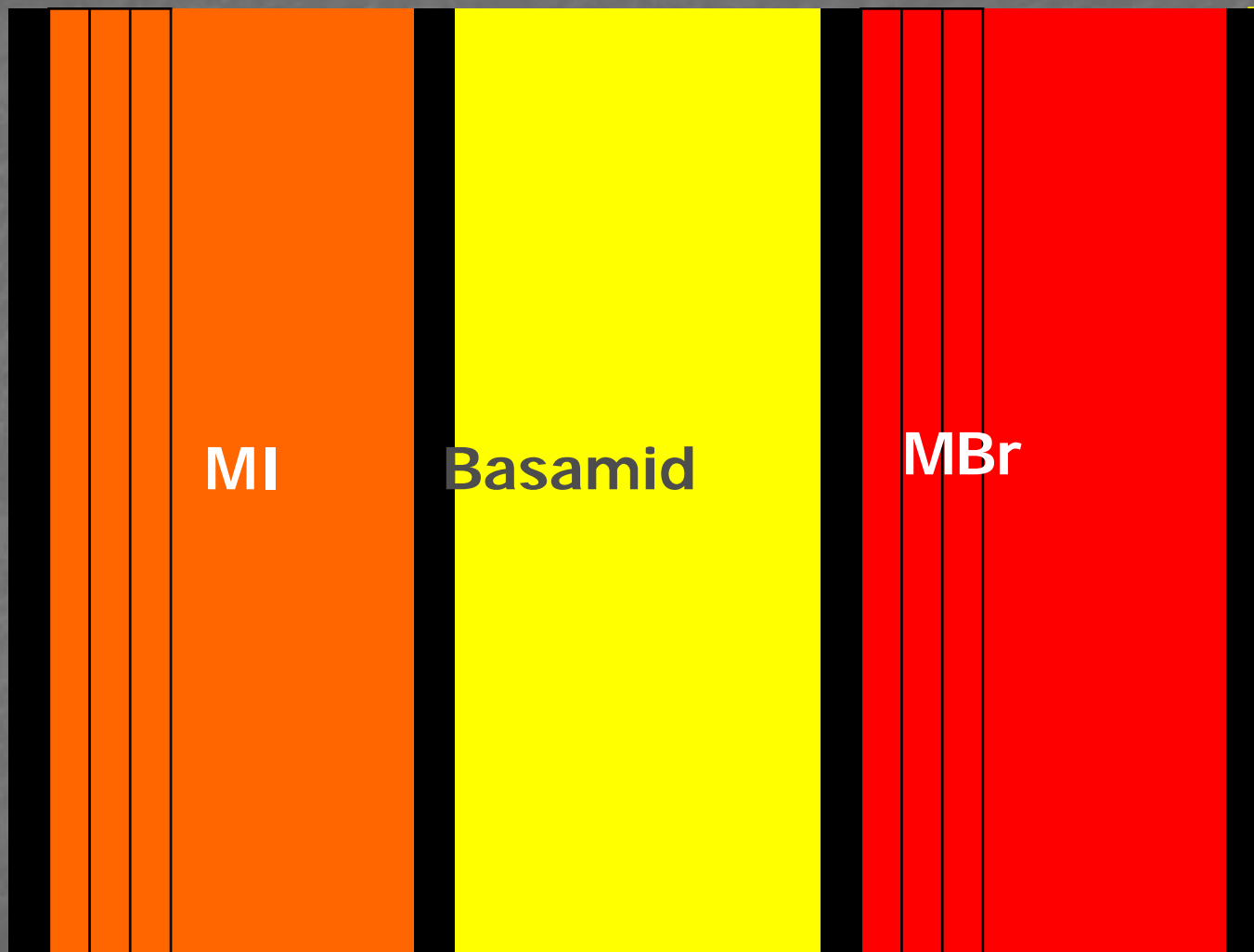
VIF

HD

None

VIF

HD



Each section
received
no tarp
(Basamid)
or both
virtually
impermeable
film (VIF)
or High
Density (HD)
polyethylene
plastic.

Section

4

5

6



Basamid

MI - VIF

MI - HD

April, 2005



Seedling characteristics by species and soil fumigation - 2005 Glennville, GA

	Loblolly Pine				Slash Pine		
	MB ¹	MI	BAS		MB	MI	BAS
Density (ft ²)	21.6	22.9	20.3		20.6	20.0	18.5
RCD (mm)	4.9 a	4.7 a	4.3 b		5.3	5.2	5.4
Height (in)	12.6 a	12.2 a	9.3 b		12.0 a	11.9 a	10.7 b
Root Bio (g)	0.65	0.65	0.61		0.64	0.66	0.78
Shoot Bio (g)	4.3 a	4.2 a	3.3 b		5.0 a	5.3 a	5.9 b

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



MI

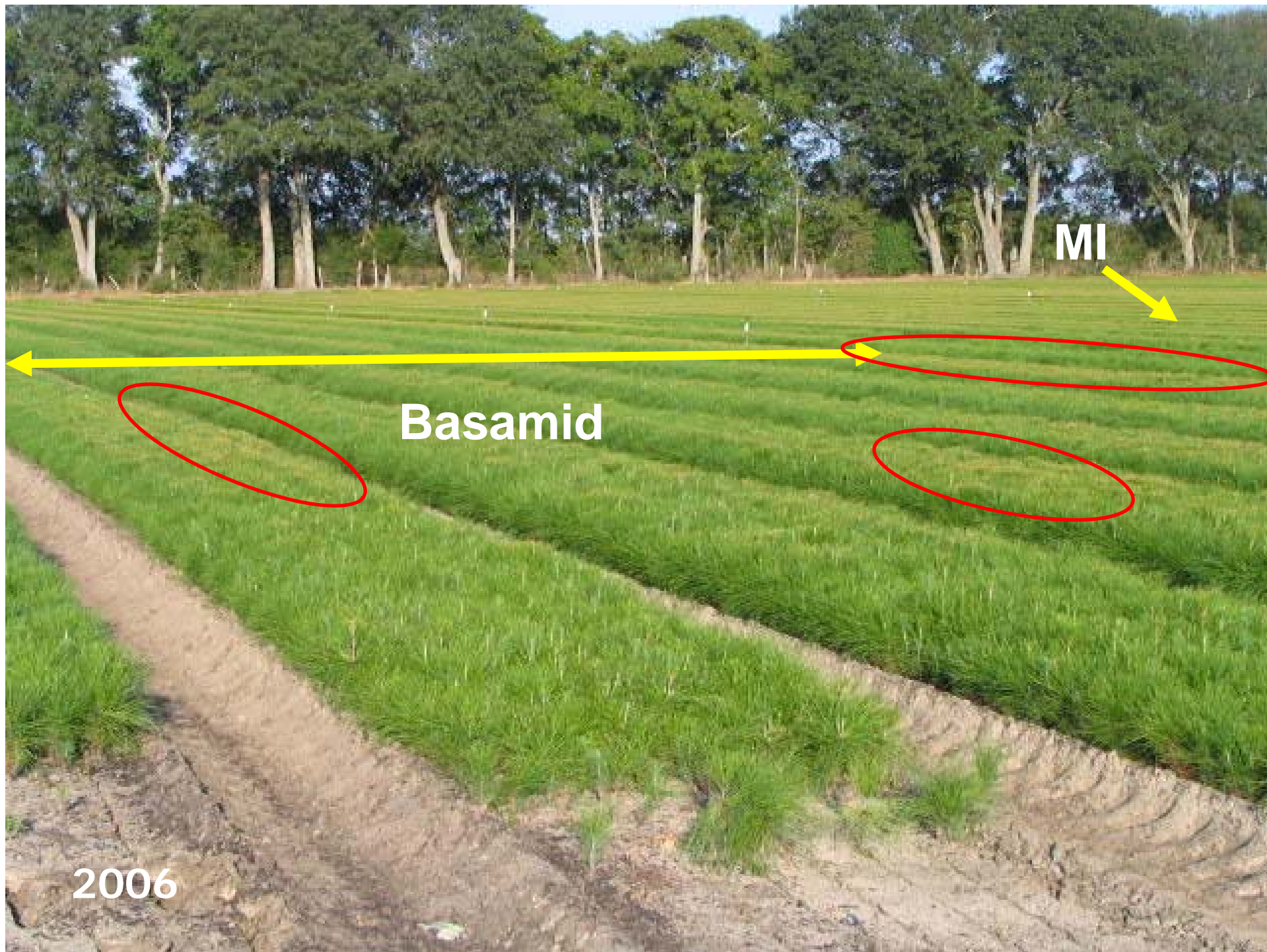
Basamid

2005

Seedling characteristics by species and soil fumigation - 2006 Glennville, GA

	Loblolly Pine				Slash Pine		
	MB ¹	MI	BAS		MB	MI	BAS
Density (ft ²)	15.0	15.4	14.8		18.7	16.9	17.6
RCD (mm)	4.3 a	4.0 b	3.6 c		4.1 b	4.7 a	4.2 b
Height (in)	9.9 a	8.5 b	7.8 b		9.2 bc	10.1 a	9.6 a b
Root Bio (g)	0.55 a	0.54 ab	0.47 bc		0.50 b	0.61 a	0.45 b
Shoot Bio (g)	3.6 a	2.9 b	2.4 c		3.2 bc	4.2 a	3.7 ab

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



MI

Basamid

2006

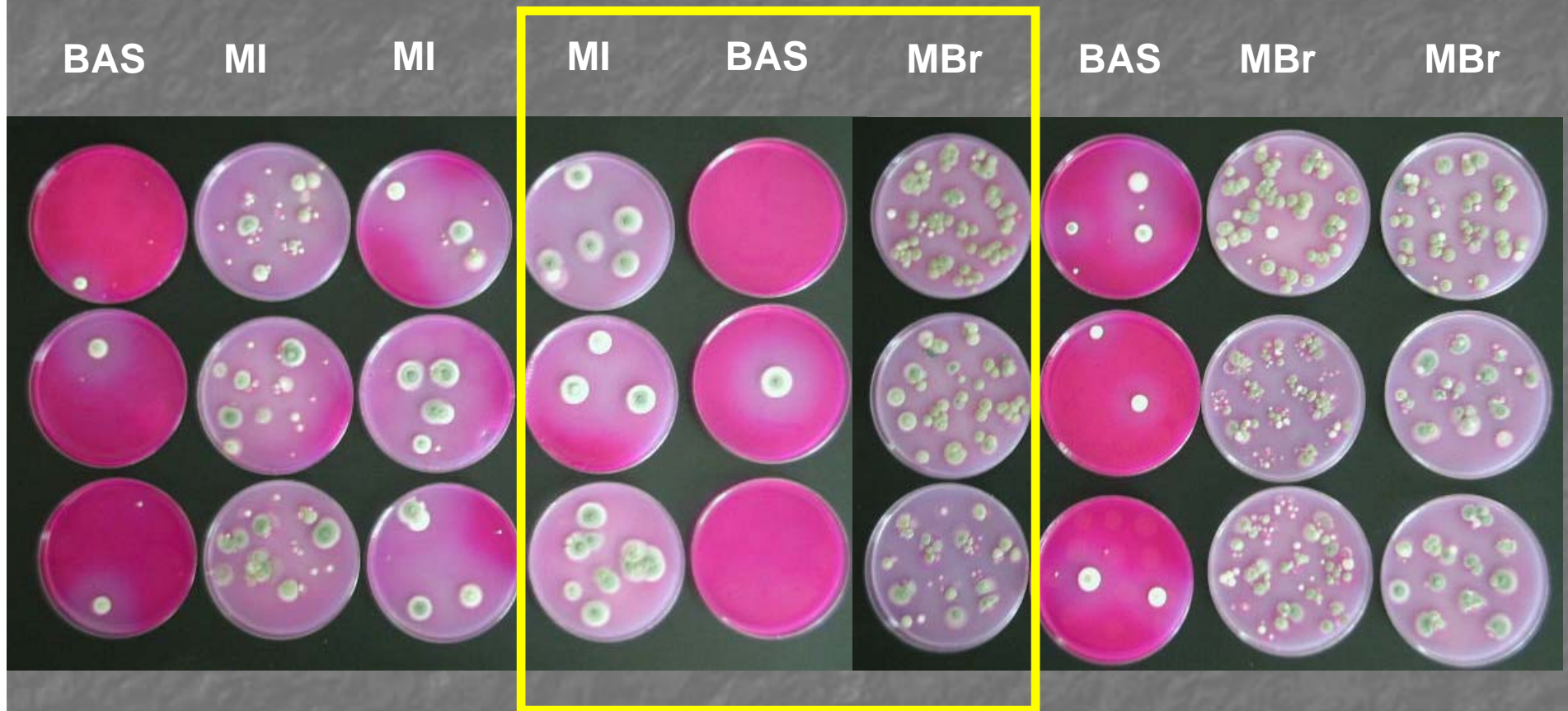
Hand weeding time and weed biomass by soil fumigation – 2005 and 2006

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

¹ Letters within a row indicate significant differences at the 0.05 level.

² Riser = 40' sections between sprinkler heads

Year 1 - Trichoderma dilution plates 1st seedling crop & 11 months after Basamid fumigation, (10/05)



Block 1

Block 9



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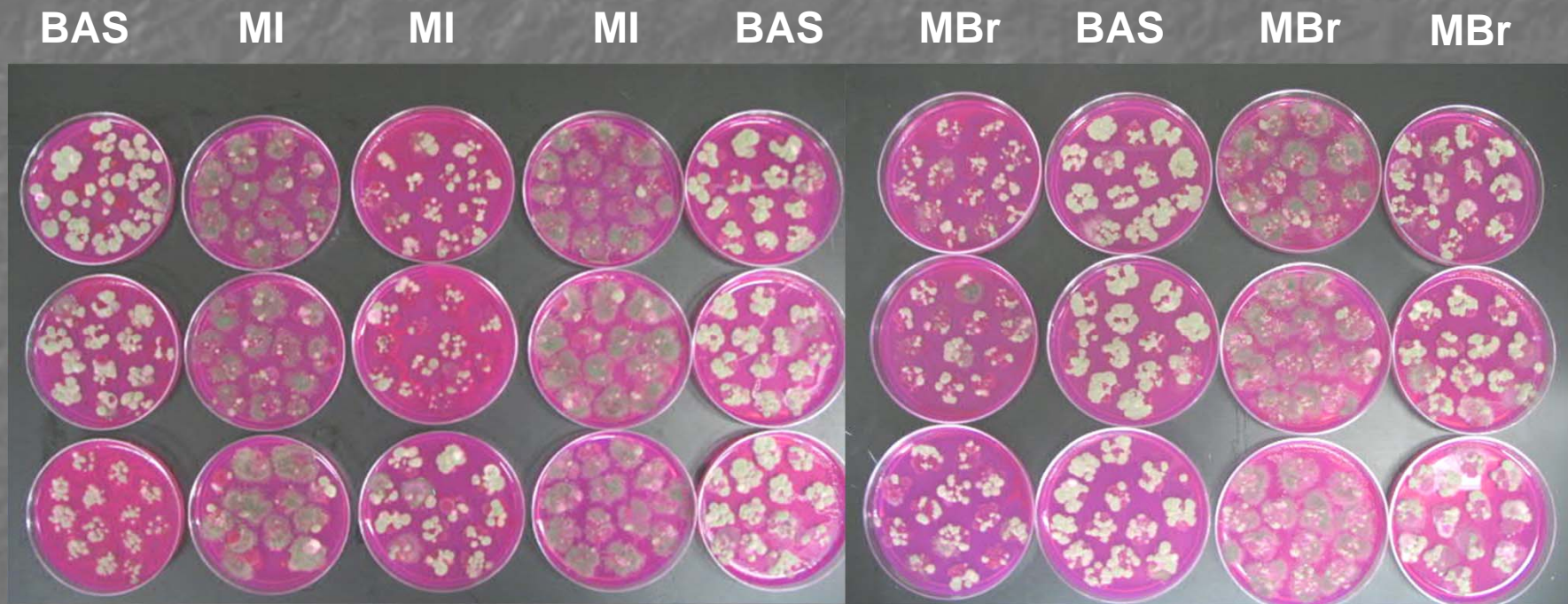
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This is similar to what Bill had reported in a previous study

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Year 2 - Trichoderma dilution plates 18 months after Basamid fumigation (5/06)



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s4

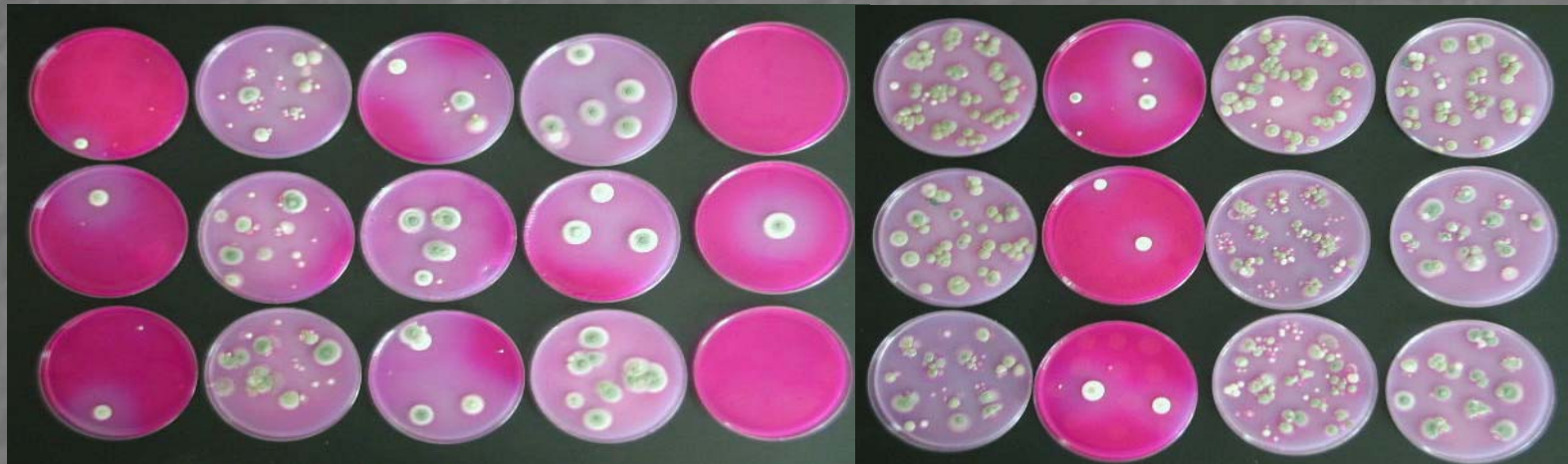
There were actually 4 plates per trt. Only 3 are shown so it is comparable to last year

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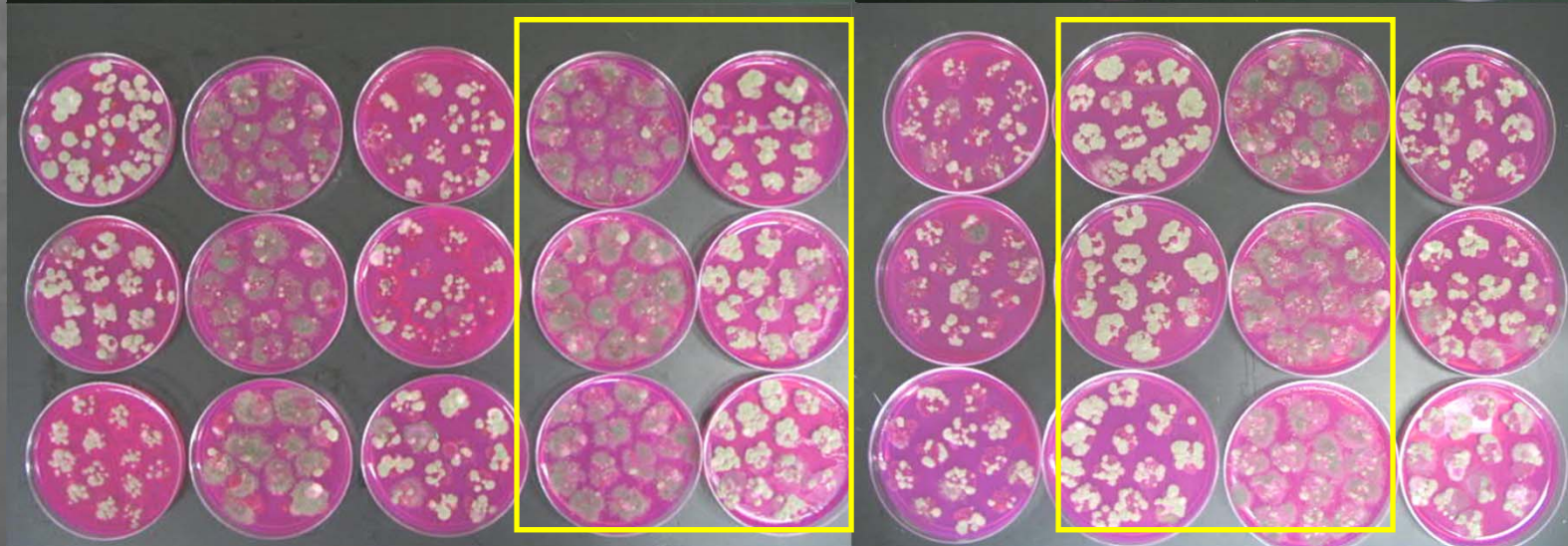
Year 1 & Year 2 Trichoderma dilution plates - Glennville GA

Year 1

BAS MI MI MI BAS MBr BAS MBr MBr



Year 2



The effect of fumigant type on number of fungal colonies

Fumigant	Mean cfu/g ¹ soil of <i>Trichoderma</i> <u>10/05</u> ²	Mean cfu/g soil of Total Fungi <u>5/06</u>	Mean cfu/g soil of Total Fungi <u>10/06</u>
MBr	155.6 a	140.2 a	111.5 b
MI	32.6 b	106.4 b	100.0 b
Dazomet	15.3 b	142.6 a	162.7 a

¹ cfu/g = colony forming units per gram

² Numbers in column followed by the same letter are not significantly different at $\alpha = 0.05$.

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s5

Last year, Bas was almost 0 colonies. This year, big jump in fungi - but what type? As it turns out, it was a large jump in *Penicilium* sp.

Not the most desirable

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Percentage of dilution spots with fungal genera present for fumigants

5/06	<i>Penicillium</i> sp. ¹	<i>Trichoderma</i> sp.	Other
MBr	98.4% a	47.7% a	0.08% a
MI	83.8% b	69.2% a	0.09% a
Dazomet	100% a	0.1% b	0.09% a

10/06	<i>Penicillium</i> sp. ¹	<i>Trichoderma</i> sp.	Other
MBr	19.4% b	99.0% a	12.0% b
MI	41.8% a	91.0% b	23.4% a
Dazomet	23.7% b	100% a	5.1% c

¹ Numbers in column for each year followed by the same letter are not significantly different at $\alpha = 0.05$.

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s6

Important point - trichoderma is a much more desirable fungus in a nursery bed than Pen.

Tri was high last year - other 2 low - MB does not destroy the beneficial fungi.

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Percentage of dilution spots with fungal genera present for tarp type

5/06	<i>Penicillium</i> sp. ¹	<i>Trichoderma</i> sp.	Other
HD	91.5% a	61.5% a	0.1% a
VIF	90.8% a	55.4% a	0.1% a

Note: at this sampling time VIF had significantly less total fungi than HD

10/06	<i>Penicillium</i> sp. ¹	<i>Trichoderma</i> sp.	Other
HD	26.0% a	96.3% a	19.1% a
VIF	35.2% a	93.6% a	16.4% a

¹ Numbers in column for each year followed by the same letter are not significantly different at $\alpha = 0.05$.

Key Study Summary Points

- Methyl Bromide and Methyl Iodide produced better quality, more shippable seedlings than Basamid.
- Methyl Iodide was not an effective fumigant for weed control at 150 lbs/acre.
- *Trichoderma* levels in the soil were significantly lower up to 18 months following fumigation with Basamid compared to MBr or MI.

Key Study Summary Points

- At 23 months following Basamid fumigation, *Trichoderma* soil levels significantly increased which may explain the increase in seedling quality characteristics at the end of the second growing season.

Key Study Summary Points

- VIF tarping significantly reduced the recovery of total fungal colonies up to 12 months when compared to HD.
- VIF tarping with MBr @ 150 lbs/acre produced seedlings similar to 300 lbs/acre MBr under HD tarp.
- There is still no operational method for gluing VIF in broadcast (flat tarp) systems.

EPA Drops Plan to Approve Pesticide

By Marla Cone, Times Staff Writer

April 27, 2006

The U.S. [Environmental Protection Agency](#) has [withdrawn its plan to approve](#) a highly toxic fumigant for strawberries and other high-value crops after California officials, labor unions, environmentalists and others objected that nearby residents and farmworkers could be in danger.

The new pesticide, [methyl iodide](#), is designed to replace methyl bromide, which is banned under an international treaty because it damages the Earth's ozone layer. Strawberry growers, concentrated mostly in Ventura and Santa Cruz counties, have been searching for nearly 15 years for a fumigant to replace methyl bromide, which they have been phasing out but are still using under exemptions granted by the United Nations. Facing criticism that it was substituting one dangerous chemical for another, the EPA decided not to register methyl iodide, also known as iodomethane. [It will reevaluate the pesticide next year.](#)

"EPA's refusal to automatically approve the use of another dangerous chemical as an alternative to methyl bromide is encouraging," said Susan Kegley, senior scientist at the environmental group Pesticide Action Network North America. ["They didn't knock it out for good, but](#) it's a good sign that they are holding off."



2006 Advisory
Meeting

Indian Mound, Texas
Fumigation Study -
Early First Year Data

Scott Enebak
Tom Starkey
Auburn Univ. Forest Nursery Coop

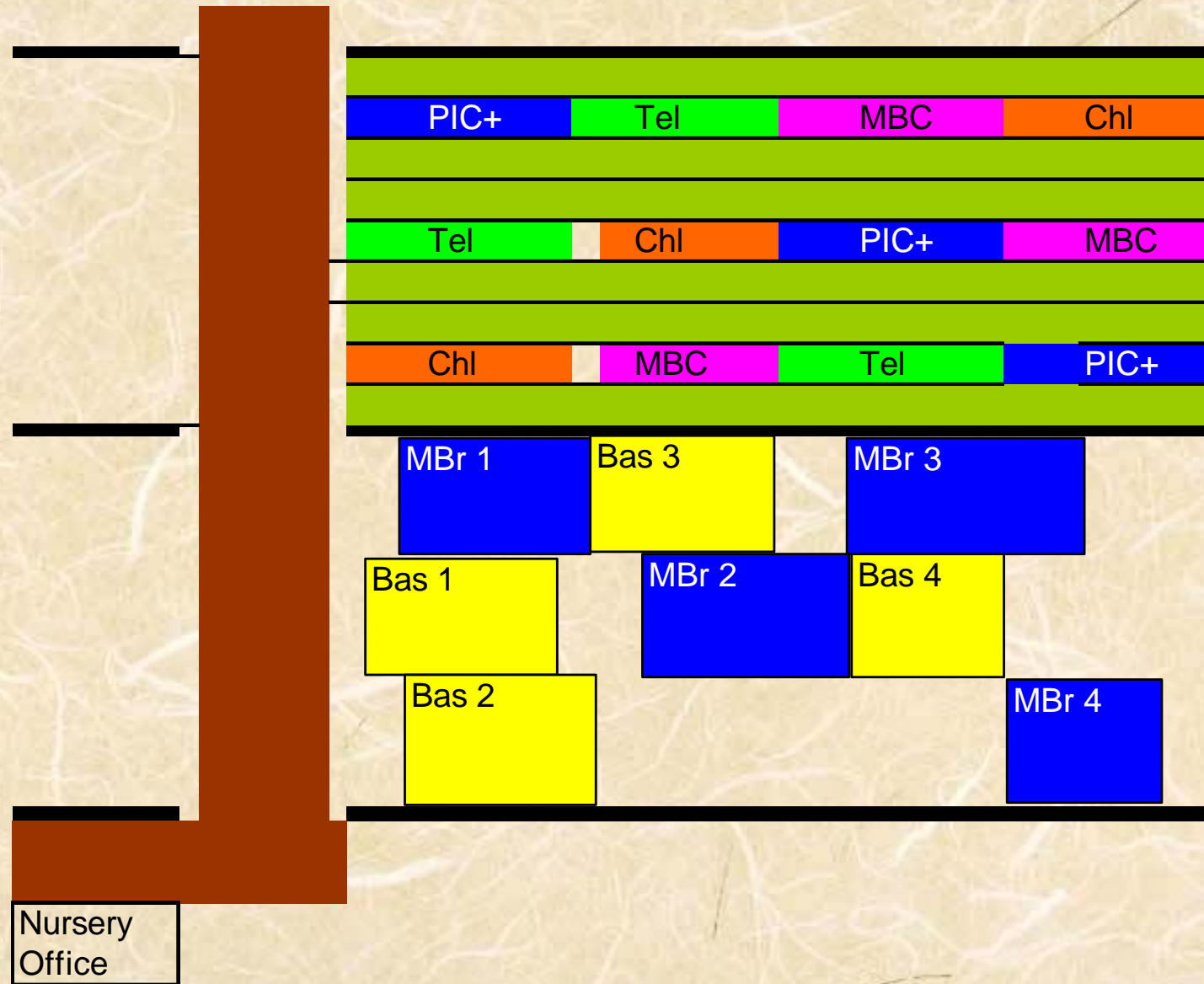
Harry Vanderveer
Texas Forest Service, Alto, TX



Indian Mound Study I

- Located near Nursery Office
- 1st section treatments - 3 bed rows, ~100' long, 4 replicates
 - MBr (98/2) @350 lbs/a (Nov. 2005)
 - Basamid @ 450 lbs/a (Oct. 2005)
- 2nd section treatments – 3 bed rows, 120' long 3 replicates
 - Chloropicrin 60 (60% Chl. + 40% Telone) @ 300 lbs/a (Nov. 2005)
 - PIC+ (85% Chl. + 15% Solvent) @ 300 lbs/a (Nov. 2005)
 - MBC 70/30 (70% 98/2 (MBr/Chl) + 30% Solvent @ 350 lbs/a (Nov. 2005)
 - Telone C35 (65% Chl. + 35% Telone) @330 lbs/a (Nov. 2005)
 - Control – non-treated bedrows within section

Study I



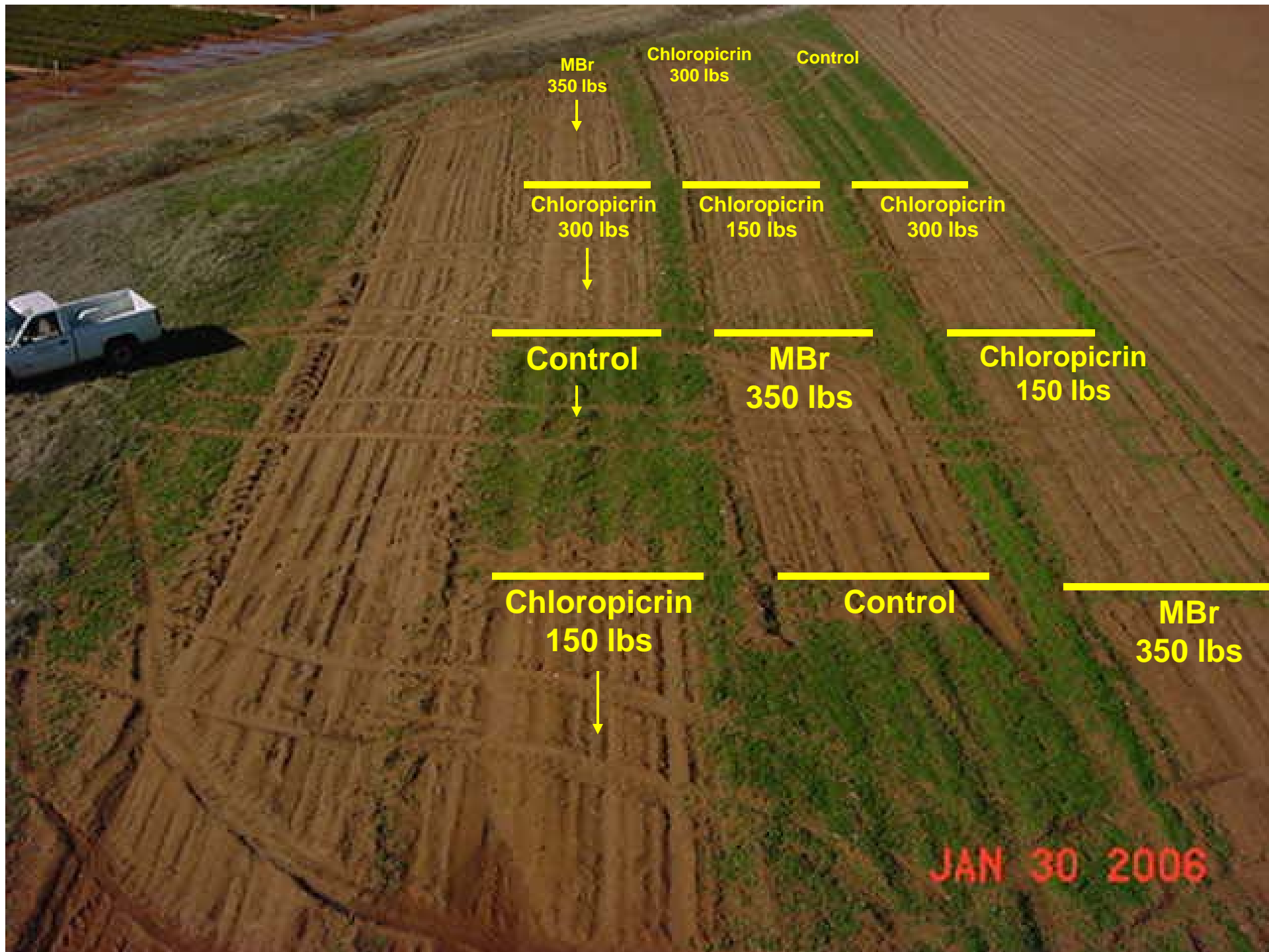
Indian Mound Study II

- Located across road
- All treatments in 1 section. Each treatment 3 bedrows, 40' long, 3 replicates
 - Chloropicrin @ 150 lbs/a (Nov. 2005)
 - Chloropicrin @ 300 lbs/a (Nov. 2005)
 - MBr 98/2 @ 350 lbs/a (Nov. 2005)
 - Control

Study II



C150	Cntl	C300	Mbr
Cntl	Mbr	C150	C300
Mbr	C150	C300	Cntl



Data collected to date

- Data collected July Contact meeting
- Preliminary – Wow!
- Additional data will be collected early January 2007.

Study 1 (July 2006)

TRT	<i>Height (in)</i>	<i>RCD (mm)</i>	<i>Total Dry Wt (gms)</i>	<i>Seedling Counts (per sq ft)</i>
Bas	5.7 a	2.4 a	0.9 a	14.9 b
Mbr	6.2 b	2.5 bc	0.9 a	16.6 b
Telone 35	6.3 b	2.5 bc	1.0 ab	15.0 b
CNTRL	6.3 b	2.4 ab	0.9 a	10.4 a
MBC 70/30	6.5 b	2.6 c	1.0 ab	14.3 b
C-60	6.8 c	2.7 d	1.2 c	14.7 b
PIC+	7.5 d	2.8 d	1.3 c	17.9 b

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

Study II (July 2006)

<i>TRT</i>	<i>Height (in)</i>	<i>RCD (mm)</i>	<i>Total Dry Wt (gms)</i>	<i>Seedling Counts (per sq ft)</i>
CNTRL	5.0 a	2.5 a	0.7 a	13.1 a
Ch150	5.9 b	2.4 a	1.1 b	12.8 a
MBr	6.7 c	2.7 b	1.3 bc	15.7 a
Ch300	7.2 d	2.7 b	1.4 c	12.1 a

