

2007 Year End Report Area-wide Demonstration of Methyl Bromide Alternatives: Forest Nurseries in the Southern US

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Cooperators in Research

- Steve Godbehere, Hendrix & Dail, Tifton, GA
- Dean McCraw & Rayonier Staff, Glennville, GA
- Ken Woody, Plum Creek, Jesup, GA
- USDA – ARS Area-Wide Pest Mgt Project for Methyl Bromide Alternatives – South Atl. Region

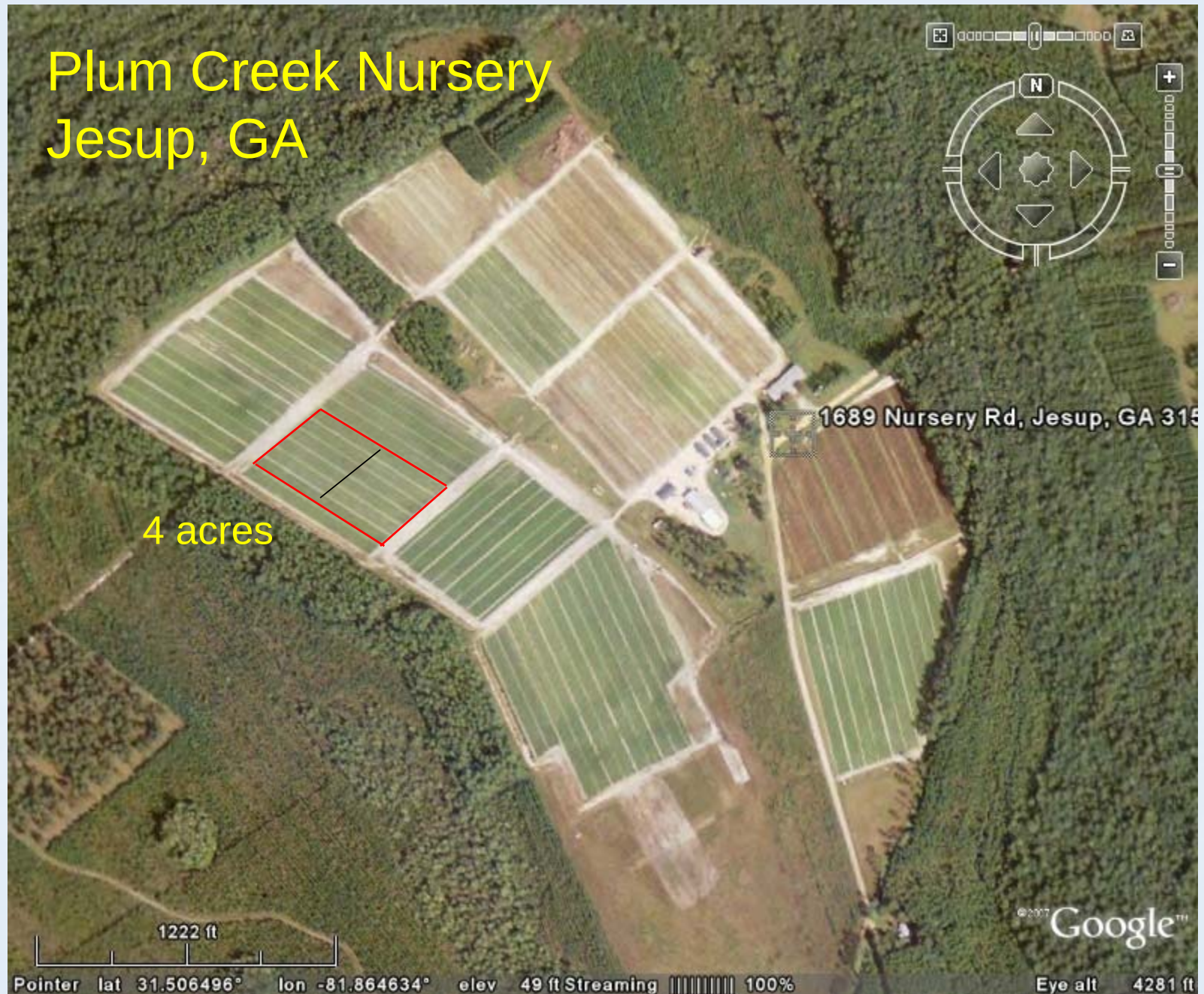
2007 Fumigants

Fumigant	Rate	Components
MBr	350 lbs/acre	67% MBr + 33% Chloropicrin
Chloropicrin	300 lbs/acre	100% Chloropicrin
MBrC 70/30	400 lbs/acre	70% MBr (98/2) + 30% Solvent A
Chlor 60	400 lbs/acre	60% Chloropicrin + 40% 1,3-D
Pic+	300 lbs/acre	85% Chloropicrin + 15% Solvent A
New Pic+	300 lbs/acre	85% Chloropicrin + 15% Solvent B
DMDS + Chlor	74 gal/acre (731 lb/acre)	79% DMDS + 21% Chloropicrin

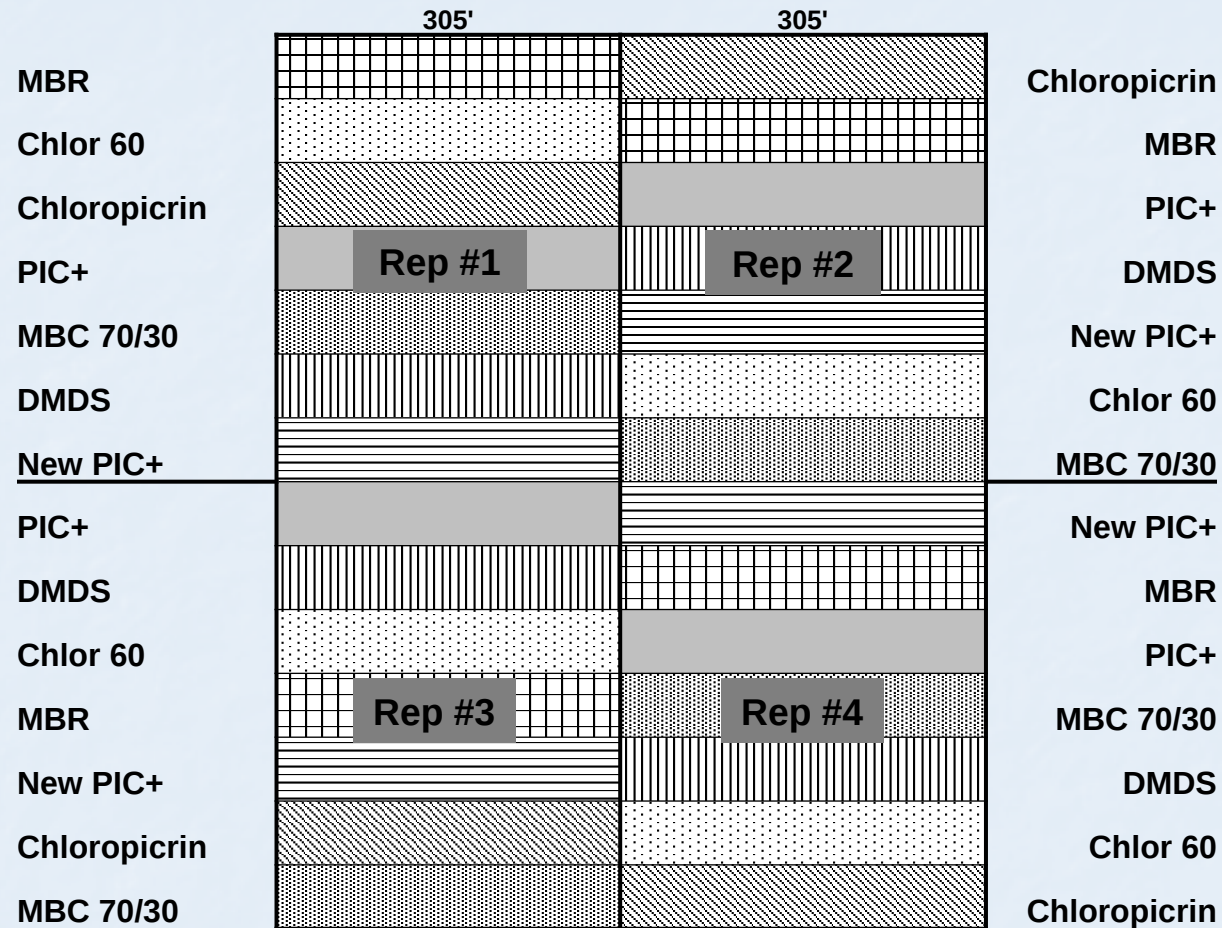
Trial Information

	Jesup, GA	Glennville, GA
Fumigation	April 3, 2007	March 20, 2007
Fumigation type	Shank injected Broadcast/flat tarp	Shank injected Broadcast/flat tarp
Area in trial	4 acres	10 acres
Air temperature range	67° to 88°F	50° to 78°F
Wind speed	3 – 6 mph	3 – 13 mph
Soil moisture	8.5%	5.5%
Soil series	Norfolk loamy sand	Tifton loamy sand
Plastic in place	7 days	7 days

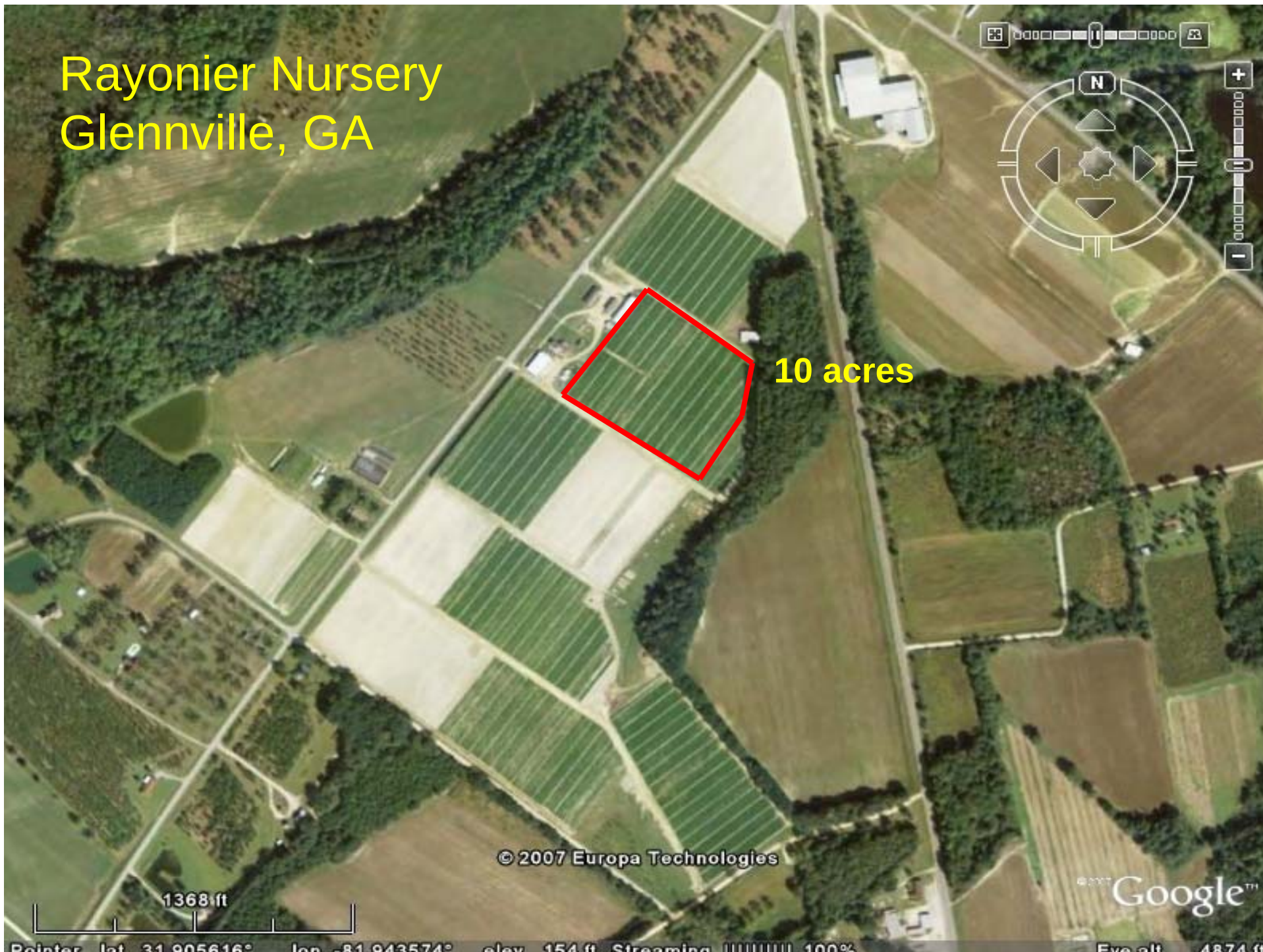
Plum Creek Nursery Jesup, GA



Jesup, GA Trial



Rayonier Nursery Glennville, GA



10 acres

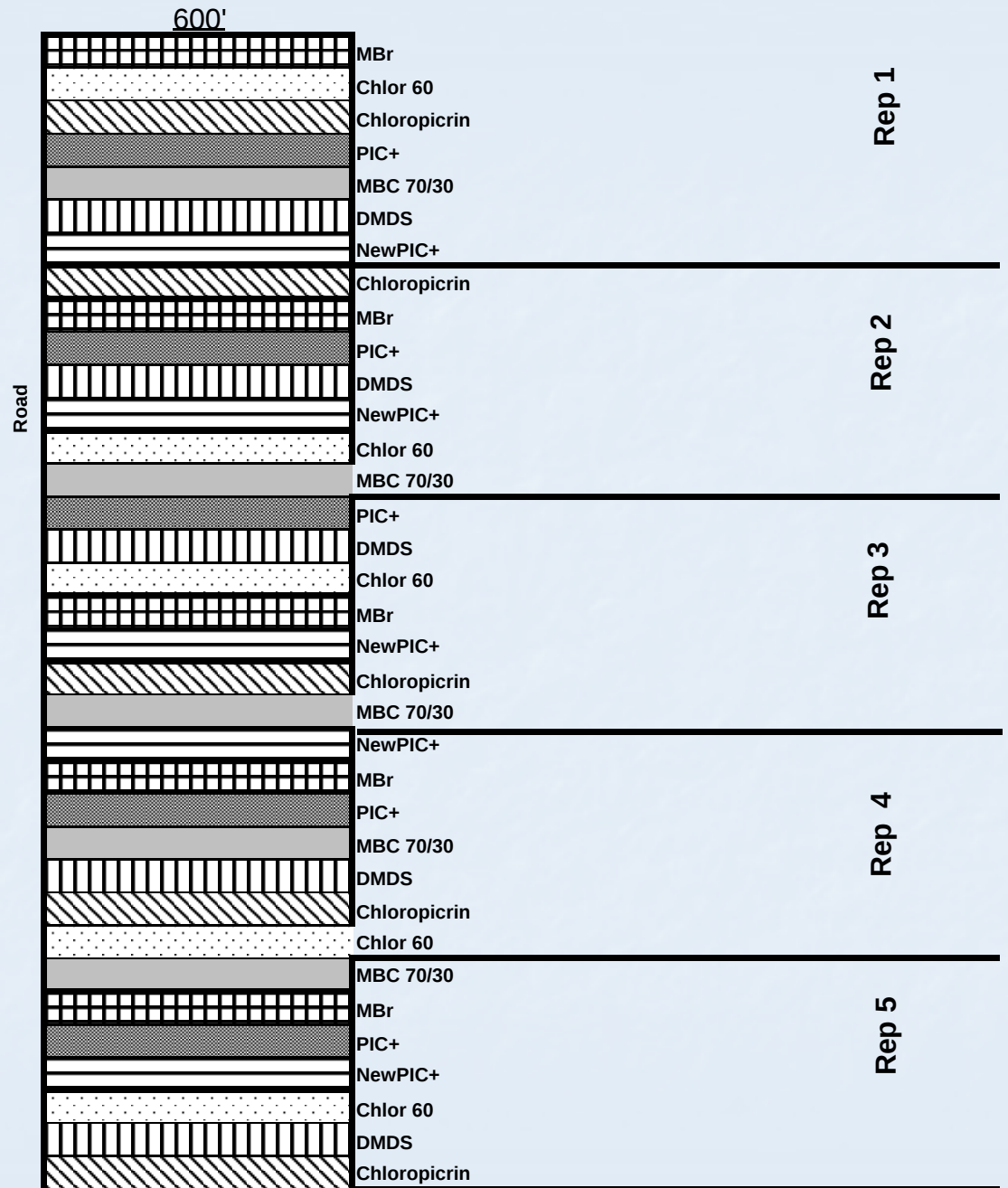
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Google™

1368 ft

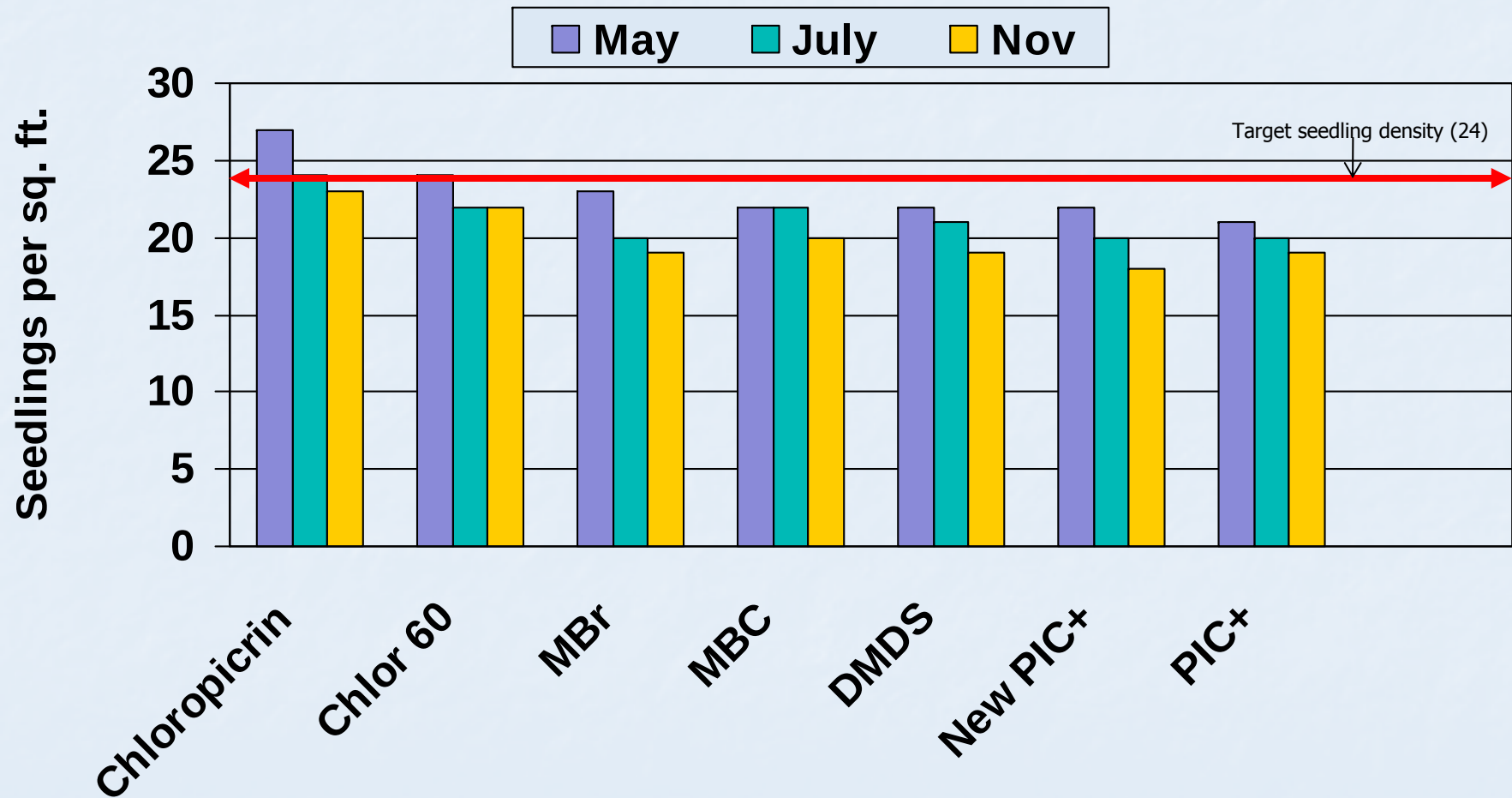
Pointer lat: 31.905616° lon: -81.943574° elev: 154 ft Streaming 100% Eye alt: 4874 ft

Glennville, GA Trial



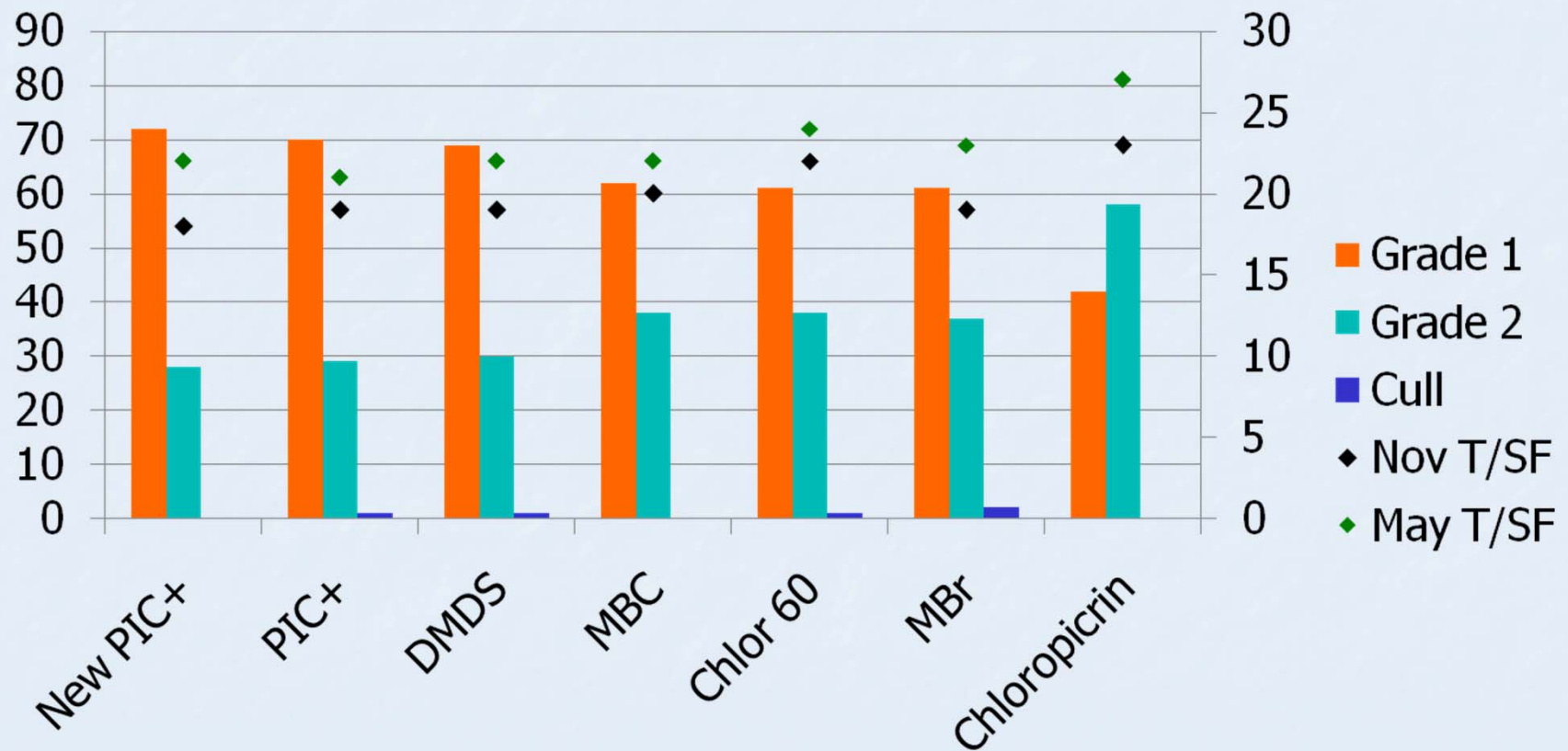
Seedling Counts

Jesup, GA May, July & Nov 2007



Seedling Grades 2007

Jesup, GA



Root Morphology 2007

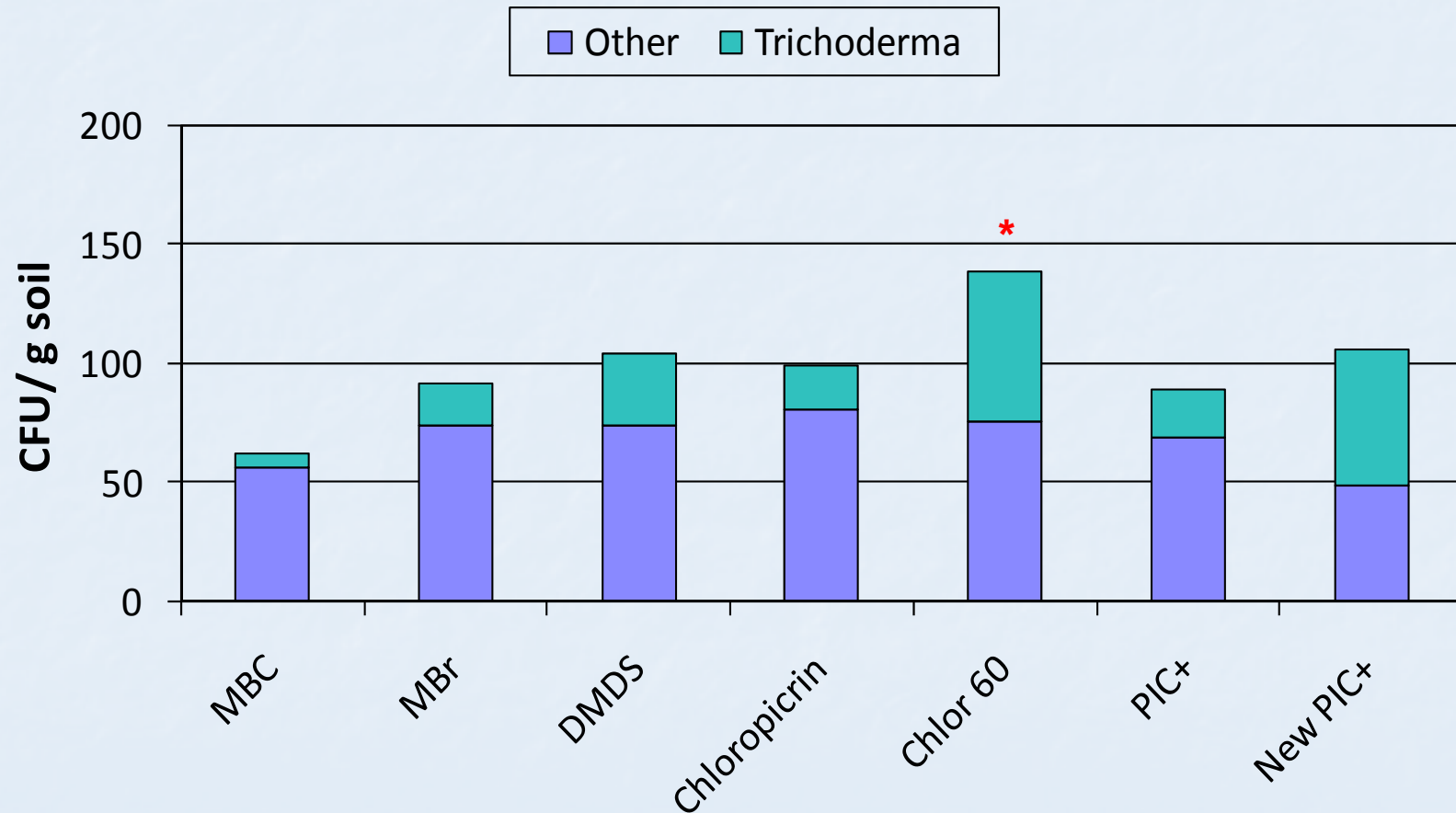
Jesup, GA

Treatment	Length (cm)	Surface Area (cm ²)	Avg Dia (mm)	# Root tips
MBC 70/30 ✓	317	91	0.91	943
MBr ✓	315	91	0.92	909
New PIC+ ✓	313	90	0.92	941
DMDS ✓	299	86	0.93	925
PIC+	277	84	0.96	834
Chlor 60	274	78	0.90	806
Chloropicrin	254	69	0.87	730
LSD (0.05)	31	9	0.05	95

Measured using WinRhizo by Regent Instruments Inc.

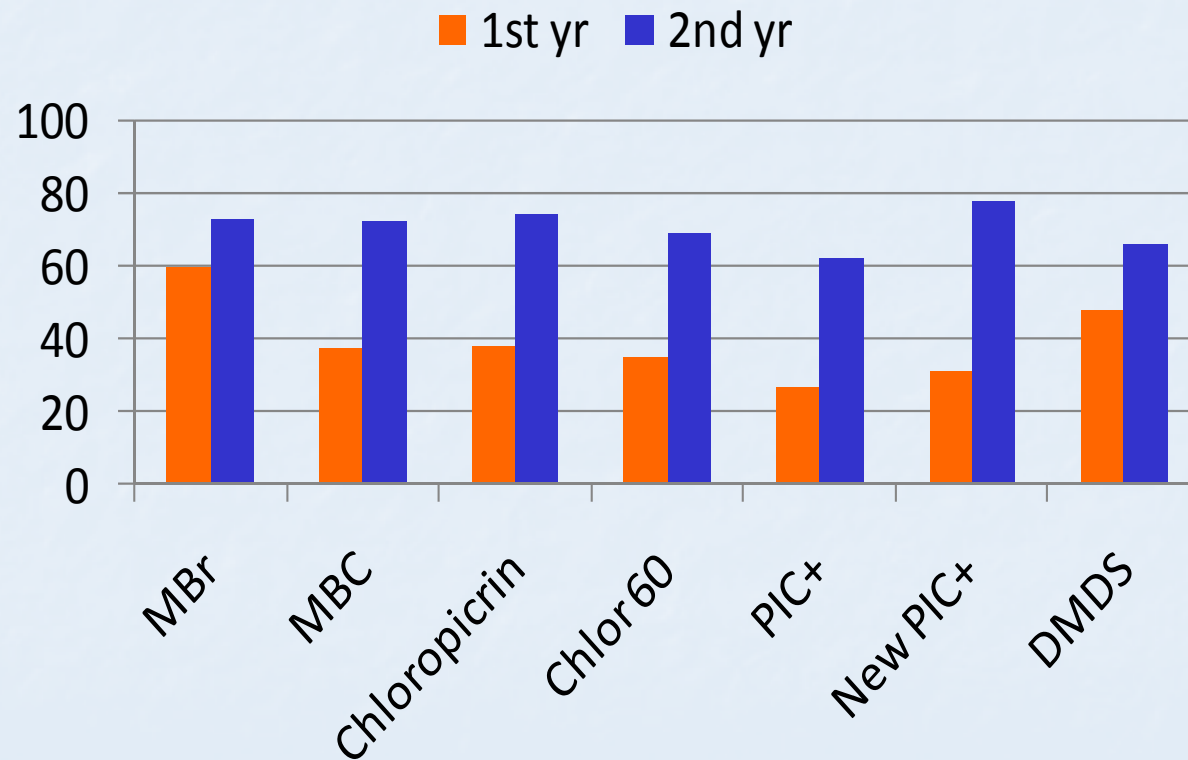
Soil Fungal Counts Nov 2007

Jesup, GA



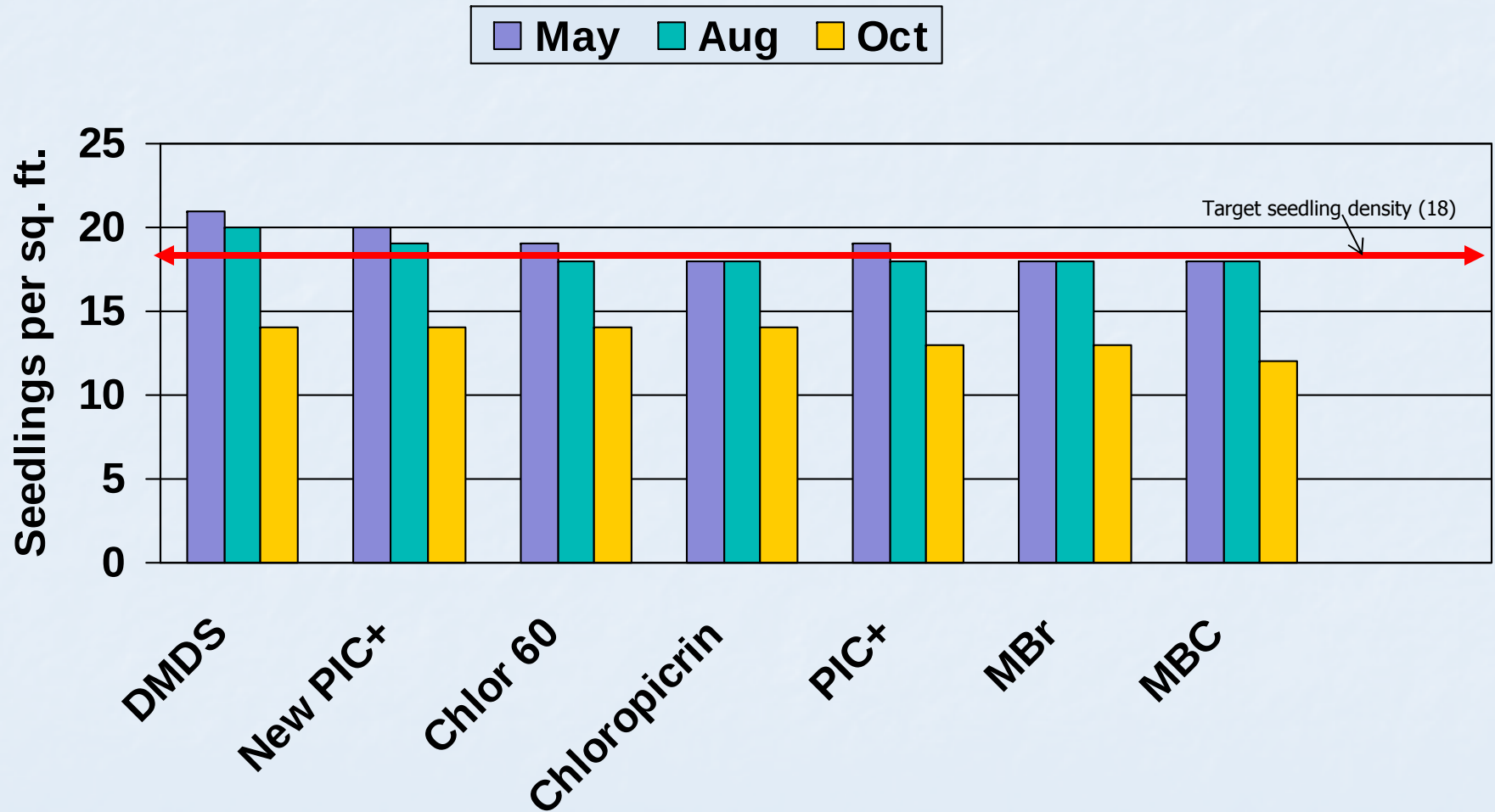
Percent Trichoderma

Pre sowing
Jesup, GA



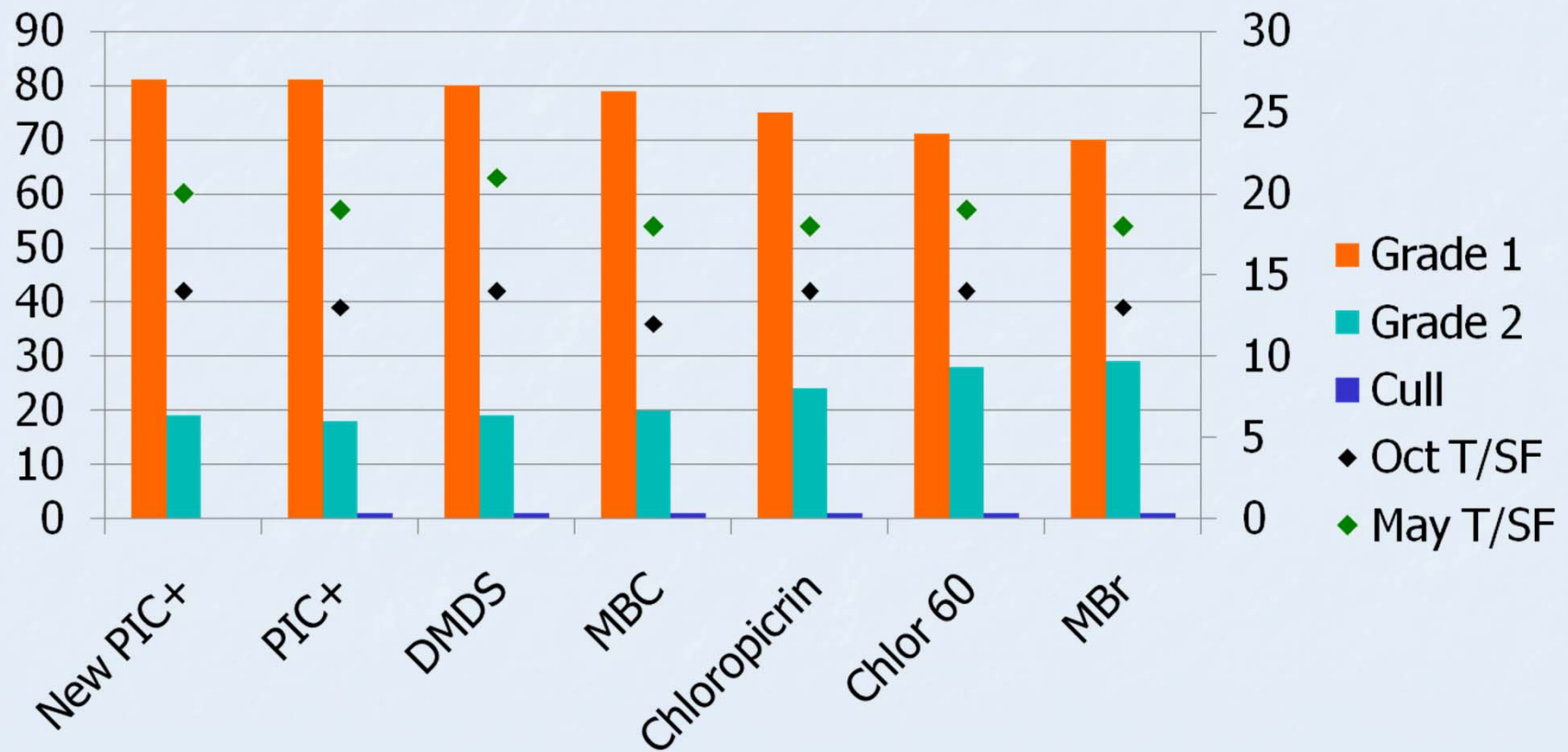
Seedling Counts

Glennville, GA May, Aug & Oct 2007



Seedling Grades 2007

Glennville, GA



Root Morphology 2007

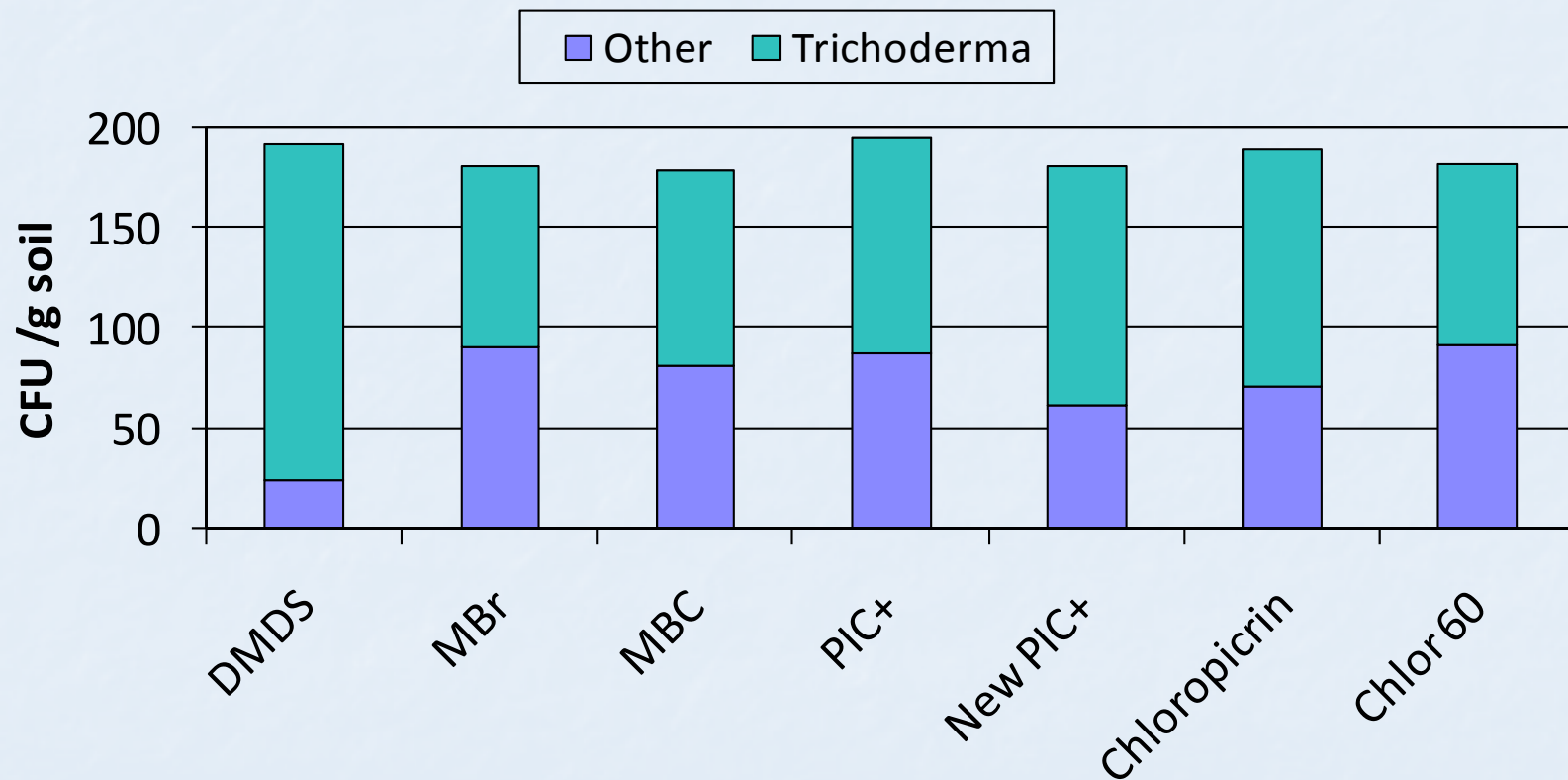
Glennville, GA

Treatment	Length (cm)	Surface Area (cm ²)	Avg Dia (mm)	# Root tips
MBC 70/30 ✓*	304	91	0.98	820
PIC+ ✓	302	88	0.93	735
MBr ✓ *	292	83	0.92	715
Chlor 60 ✓	289	86	0.95	738
DMDS *	266	78	0.95	633
New PIC+ *	264	81	0.99	680
Chloropicrin	218	68	1.02	515
LSD (0.05)	43	13	0.20	113

Measured using WinRhizo software by Regent Instruments Inc.

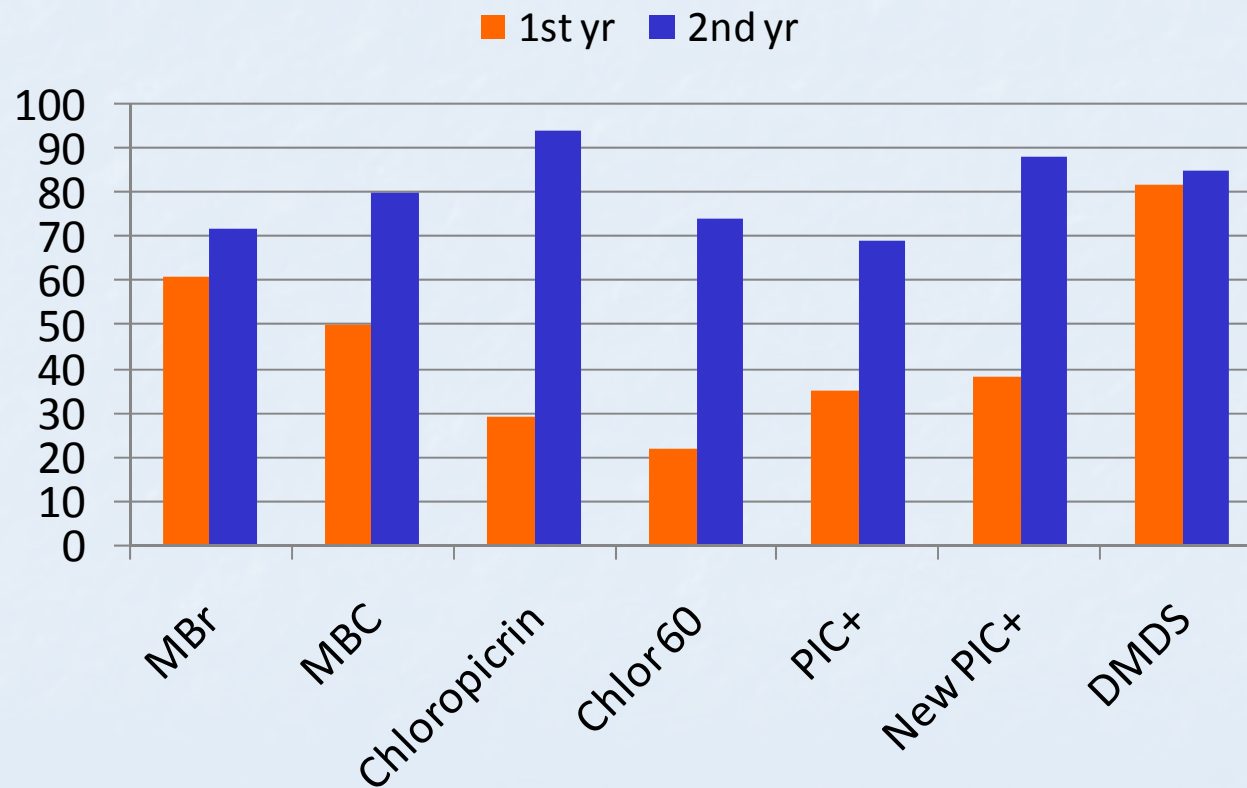
Soil Fungal Counts Oct 2007

Glennville, GA



Percent Trichoderma

Pre sowing
Glennville, GA







SUMMARY

After first crop only

Alternatives with no Methyl Bromide

DMDS + Chloropicrin

PIC+

True test is after 2nd season

2008

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- Hendrix & Dail, Greenville, NC
- Steve Cantrell, South Carolina Forestry Commission, Trenton, SC
- Gary Nelson, Arborgen, Blenheim, SC
- USDA – ARS Area-Wide Pest Mgt Project for Methyl Bromide Alternatives – South Atl. Region

2008 Fumigants

Fumigant	Rate	Components
MBr #1	400 lbs/acre	98% MBr + 2% Chloropicrin
MBr #2	235 lbs/acre	98% MBr + 2% Chloropicrin
Chloropicrin	300 lbs/acre	100% Chloropicrin
MBrC 70/30	400 lbs/acre	70% MBr (98/2) + 30% Solvent A
Chlor 60	400 lbs/acre	60% Chloropicrin + 40% 1,3-D
Pic+	300 lbs/acre	85% Chloropicrin + 15% Solvent A
DMDS + Chlor	74 gal/acre (731 lb/acre)	79% DMDS + 21% Chloropicrin
DMDS + Chlor	70 gal/acre (Blenheim, SC)	79% DMDS + 21% Chloropicrin

Trial Information

	Trenton, SC	Blenheim, SC
Fumigation	October 2, 2007	April 3, 2008
Fumigation type	Shank injected Broadcast/flat tarp	Shank injected Broadcast/flat tarp
Area in trial	5 acres	4.5 acres
Air temperature range	61 – 82°F	44 – 48°F
Wind speed	3 – 11 mph	5 – 11 mph
Soil moisture	5%	7%
Soil series	Wagram sand	Autryville sand
Plastic in place	10 days	7 days

South Carolina Forestry Commission Taylor Nursery, Trenton, SC



5 acres

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Pointer 33°44'22.76" N 81°48'57.78" W elev 597 ft Streaming ||||| 100%

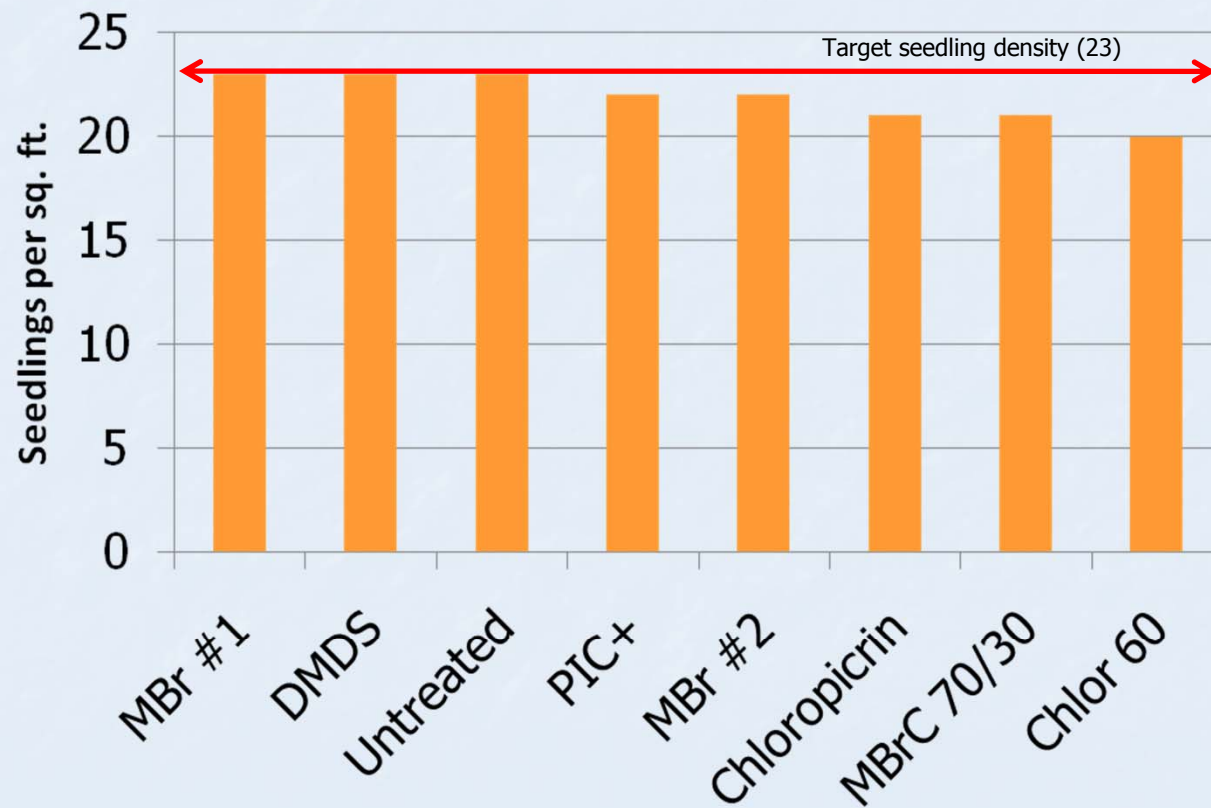
Eye alt 5467 ft

Trenton, SC

	MBr #2 - 235 lbs/a	
	Chlor 60	
	Chloropicrin	
	PIC+	
	MBC 70/30	Rep 1
	MBr #1 - 400 lbs/a	
	DMDS	
	Untreated	
	Chloropicrin	
	MBr #1 - 400 lbs/a	
	MBr #2 - 235 lbs/a	
	PIC+	Rep 2
	DMDS	
	Untreated	
	Chlor 60	
	MBC 70/30	
	PIC+	
	DMDS	
	Chlor 60	
	MBr #1 - 400 lbs/a	
	MBr #2 - 235 lbs/a	Rep 3
	Untreated	
	Chloropicrin	
	MBC 70/30	
	MBr #1 - 400 lbs/a	
	Untreated	
	MBr #2 - 235 lbs/a	
	PIC+	
	MBC 70/30	Rep 4
	DMDS	
	Chloropicrin	
	Chlor 60	
	MBC 70/30	
	MBr #2 - 235 lbs/a	
	PIC+	
	MBr #1 - 400 lbs/a	
	Untreated	Rep 5
	Chlor 60	
	DMDS	
	Chloropicrin	

Seedling count

Trenton, SC May 2008



Arborgen Nursery Blenheim, SC



4.5 acres

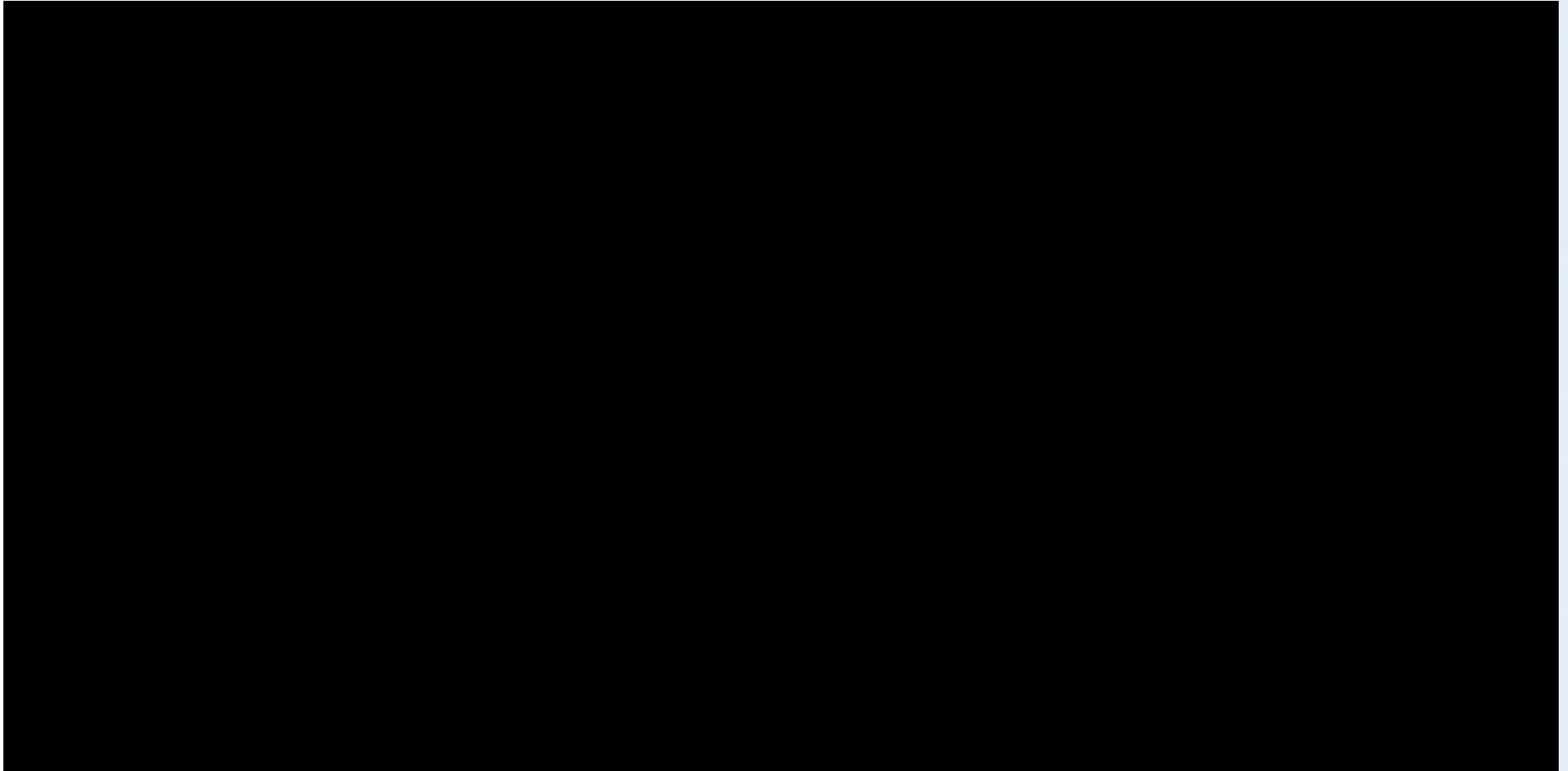
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Pointer 34°24'15.15" N 79°35'45.42" W elev 121 ft Streaming ||||| 100%

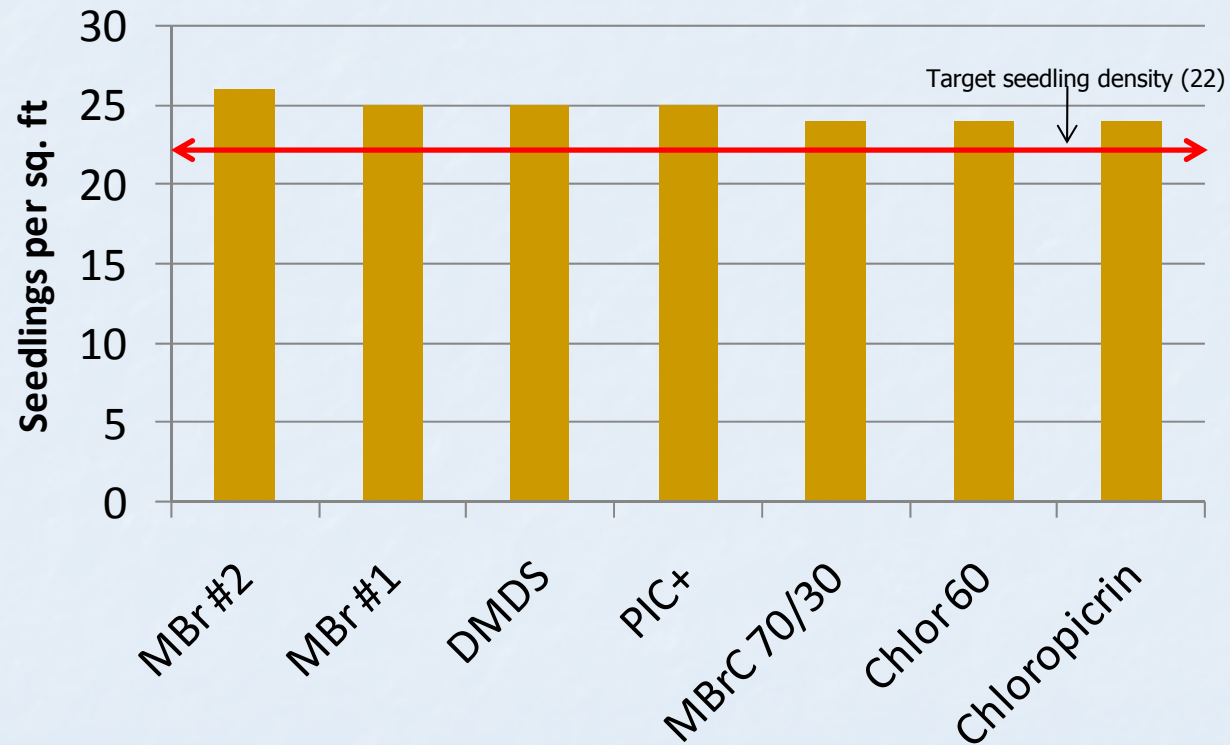
Eye alt 7371 ft

Blenheim, SC



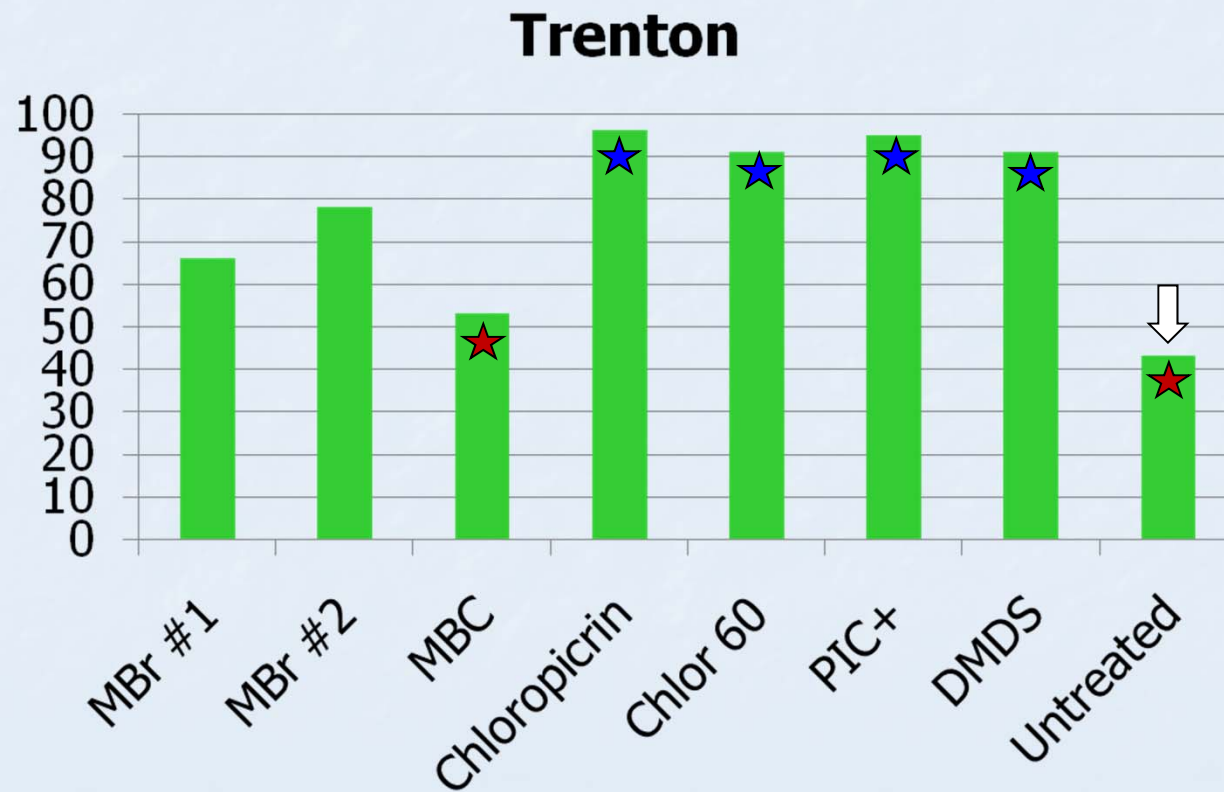
Seedling Count

Blenheim, SC May 2008



Percent Trichoderma

First year post fumigation



Data to collect

Glennville, GA Jesup, GA Trenton, SC Blenheim, SC	2008 Pre-sow	2008 Post-sow	2008 Summer	2008 Fall
Nematode	✓	✓	✓	✓
Trichoderma	✓	✓	✓	✓
Seedling count		✓	✓	✓
Seedling quality				✓
Weed quantification		✓	✓	
Root mass morphology				✓

