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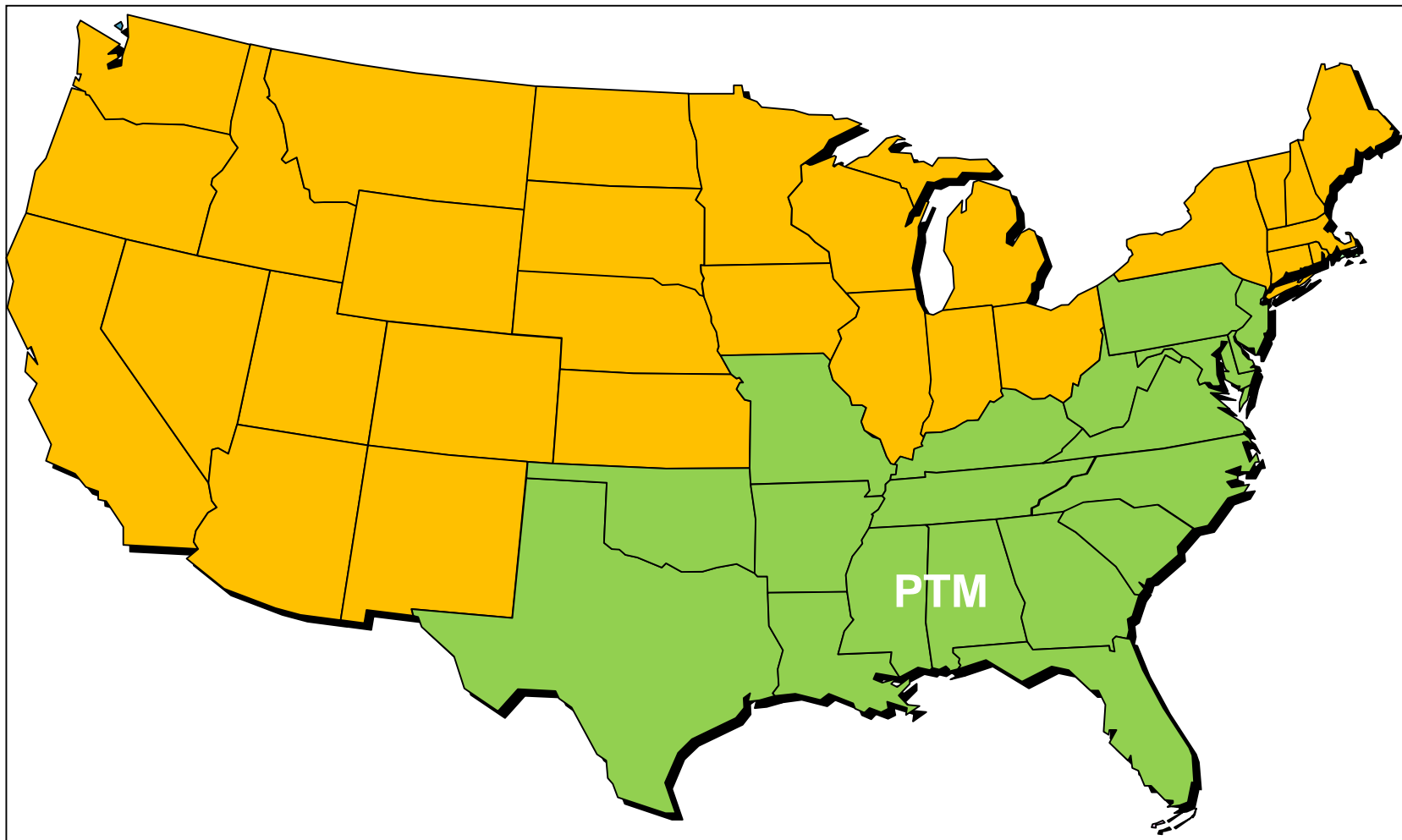


For Tip Moth, Aphid and Ant Control

Jim Bean, Strategic Accounts Manager
Professional Vegetation Management
BASF Corporation

- For control of Nantucket Pine Moth and Pine Bark Aphid at planting on forest sites
- For control of Leaf Cutter Ants and Imported Fire Ants on forest sites
- Water based suspension concentrate
- Use rate:
 - ▶ 21 fl oz (621 ml) per acre OR 1.4 ml per tree
- Applications
 - ▶ Tip Moth and Pine Bark Aphid
 - At time of planting or soon after planting for bare root trees
 - Injected into root-ball during grading for containerized trees
 - ▶ Leaf Cutter and Imported Fire Ants
 - Inject into mounds as needed

PTM State Registrations



● PTM State Registrations

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Nantucket Pine Tip Moth

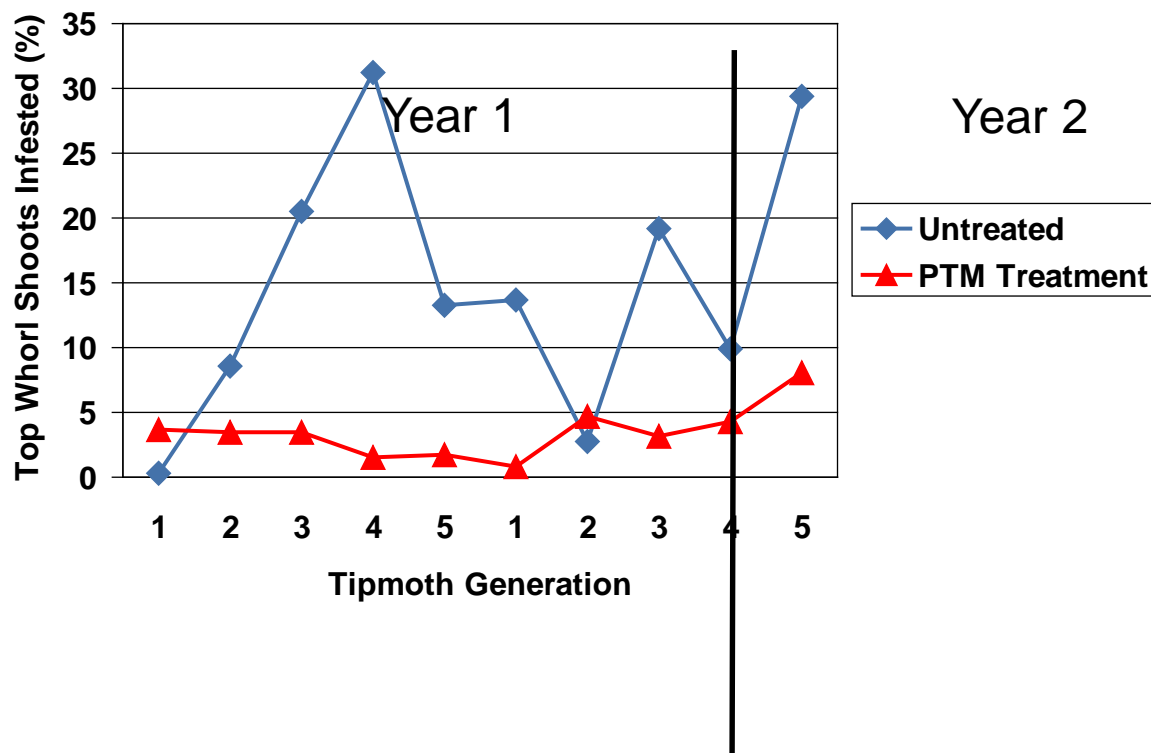


- Infests loblolly, shortleaf and Virginia pines
- Occurs in the early years of plantation establishment
- Female deposits eggs on needles and shoots
- The larvae bore into the tips of branched and leaders
- Larvae pupate in the bored holes and emerge as adults
- Result in death of actively growing pine tissue
- Two - five generations per year in the South
- On intensively-managed sites (weed control & fertilization), damage levels tends to be greater
- Results in decreased pine growth and an increase in stem deformity
- Once trees reach a height of 15 feet, tip moth problem usually tends to subside.



PTM Soil Injection

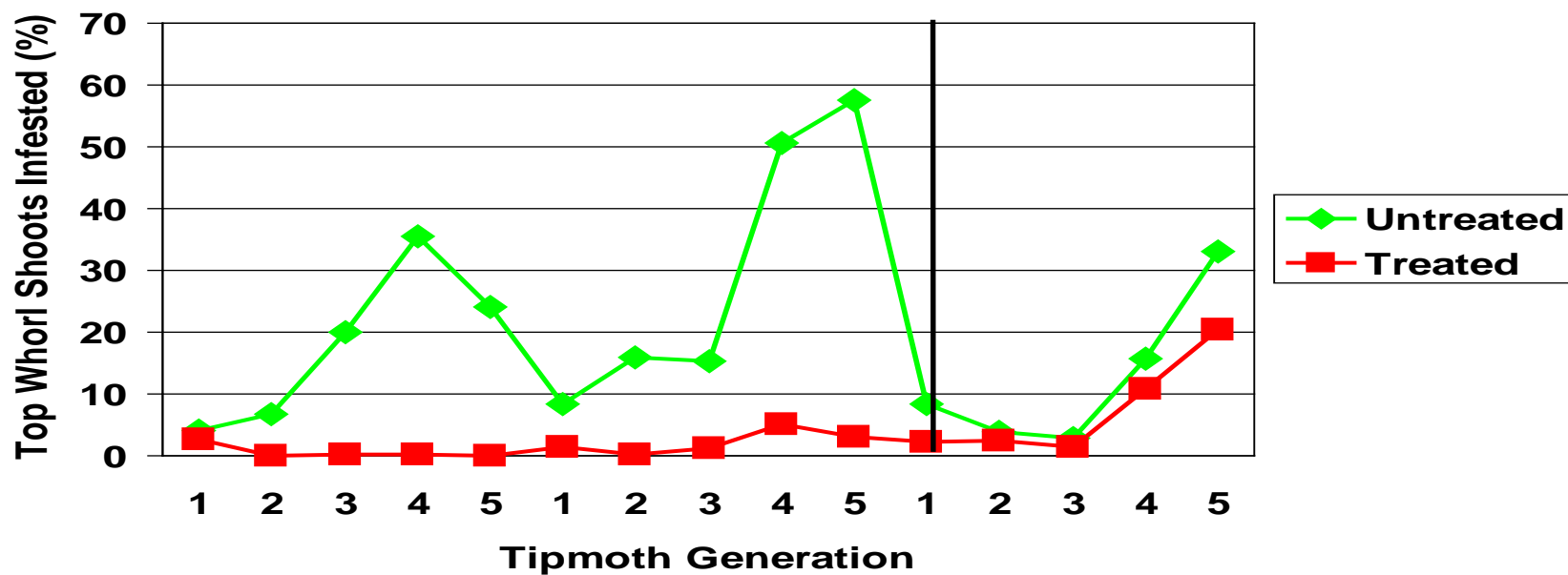
Two Years of Protection



West Gulf Pine Pest Management Cooperative. Mean of 2 installations.

PTM Insecticide

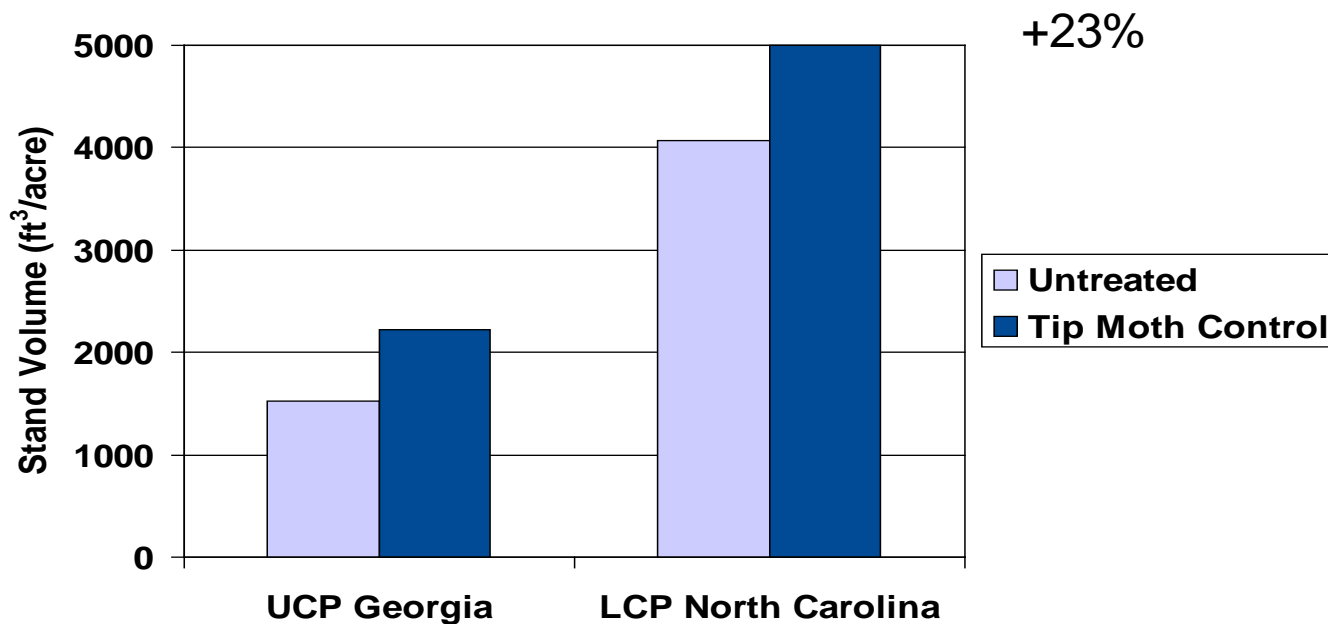
Soil Injection



West Gulf Pine Pest Management Cooperative. Mean of 4 installations.

Response to Tip Moth Control

Loblolly Pine at Age 15 Following Control in Years 1-3



Wayne Berisford, U. Georgia; Scott Cameron formerly International Paper and others.

ROI: PTM applied at planting

15-Year Response Period



Real annual rate of return

		Treatment Cost /Acre		
Response	Stumpage	\$50	\$60	\$70
<i>ft³/acre/yr</i>	<i>... \$/ton ...</i>	<i>..... ROI (%)</i>		
60 ft ³	12	10.8	9.5	8.0
	16	11.6	10.4	8.8
	20	12.6	11.4	9.8
	24	13.9	12.6	11.0

60 ft³=1.8 ton

PTM Application Rates

Soil Injection



Nantucket Tip Moth and Pine Bark Aphid Control in Pine Seedling Plantations

Apply a dilution of water and 21 fl ozs per acre **PTM Insecticide** at the time of planting or after planting. Divide 21 fl ozs by the total number of target pine seedlings to be treated per acre to obtain the amount of **PTM Insecticide** to apply per pine seedling. Refer to **Table 1**. Dilute the required amount of **PTM Insecticide** with water to apply between 0.5 and 1.0 fl oz of total dilution per pine seedling. Spot treat by injecting an amount of dilution at least 3 inches below ground into the rooting zone of each pine seedling.

PTM Application Rates

Soil Injection



Table 1. Application Volume based on Target Pine Seedlings Planted per Acre

Target Plants per acre	PTM Insecticide + Water Total Volume		PTM Insecticide	Water
	per plant	per acre		
	(fl ozs)		(fl ozs each mixed per acre)	
400	0.5	200	21	179
	1.0	400		379
500	0.5	250		229
	1.0	500		479
600	0.5	300		279
	1.0	600		579

NOTE: Use the higher volume when soil moisture level is low.

PTM Application Rates



Keeping the rate per tree constant at 1.4 ml

- ▶ Apply 0.5 fl oz (15 ml) of total dilution per tree made up as follows:
 - 13.6 ml water + 1.4 ml PTM
- ▶ This is a PTM dilution rate of 9.3%

Total Dilution (water + PTM)	PTM at 9.3%	Number of trees treated
1 qt	3 fl oz	64
1 gal	12 fl oz	256
5 gal	60 fl oz	1280

Do not exceed 21 fl oz (621 ml) PTM per acre

PTM Application Rates

Soil Injection



Treated vs Untreated



PTM Application



PTM Application with Spot Gun



PTM Application



- PTM application with hand crews
- Felton Equipment

PTM Application



- PTM injection 3" to 4" below soil and next to root zone
- Felton Gun

PTM Application



- Felton spray gun and backpack
- Felton wand tip

PTM Application



PTM Application



PTM applied into planting slit



Machine planted pine seedling



The Ideal Way to Get Immediate Tip Moth Protection



Containerized Tree Root-ball Injection



Containerized Tree Root-ball Injection



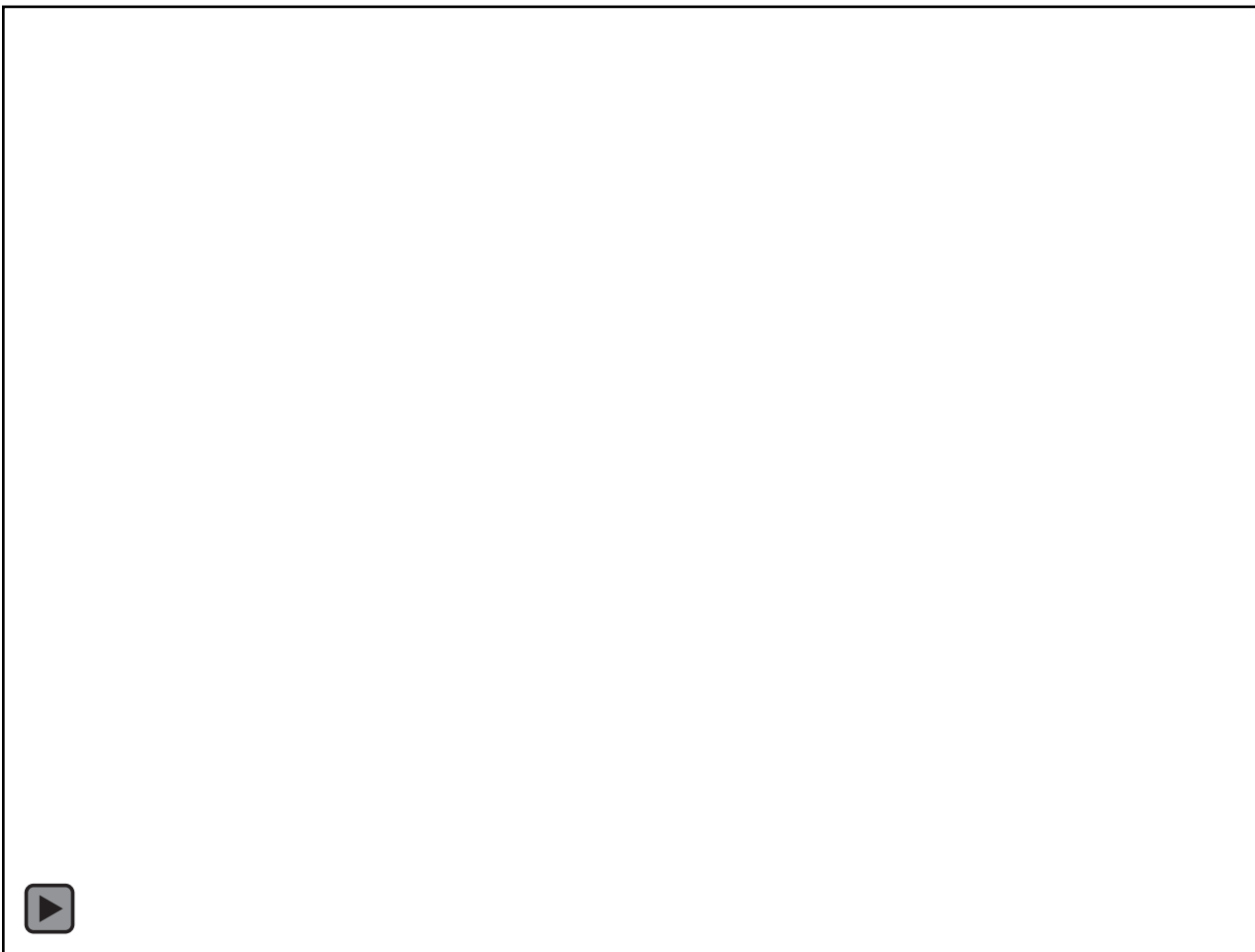
Containerized Tree Root-ball Injection



Containerized Tree Root-ball Injection



Containerized Tree Root-ball Injection



PTM Application Rates

Root-ball Injection



Table 2. Injection Volume based on Treated Pine Seedlings Planted per Acre

Treated Pine Seedlings (plants per acre)	PTM™ Insecticide Maximum Volume per Pine Seedling Root Ball		Maximum per Treated Pine Seedling (lb ai)
	(fl oz)	(mL)	
300	0.07	2.05	0.00043
400	0.05	1.54	0.000325
500	0.04	1.23	0.00026
600	0.035	1.03	0.000217

PTM Results



Untreated

Treated for pine tip moth



Containerized Tree Root-ball Injection



- Field data has confirmed results are similar or better than soil injection after planting
- Benefits
 - ▶ Tree is protected immediately
 - ▶ Save field application cost

Research Efforts in 2007 - 2010



- Evaluate efficacy of PTM™ applied to containerized seedlings.
- Evaluate efficacy of PTM™ applied one year after planting at different rates, placement, volume.



Plug Injection Trial

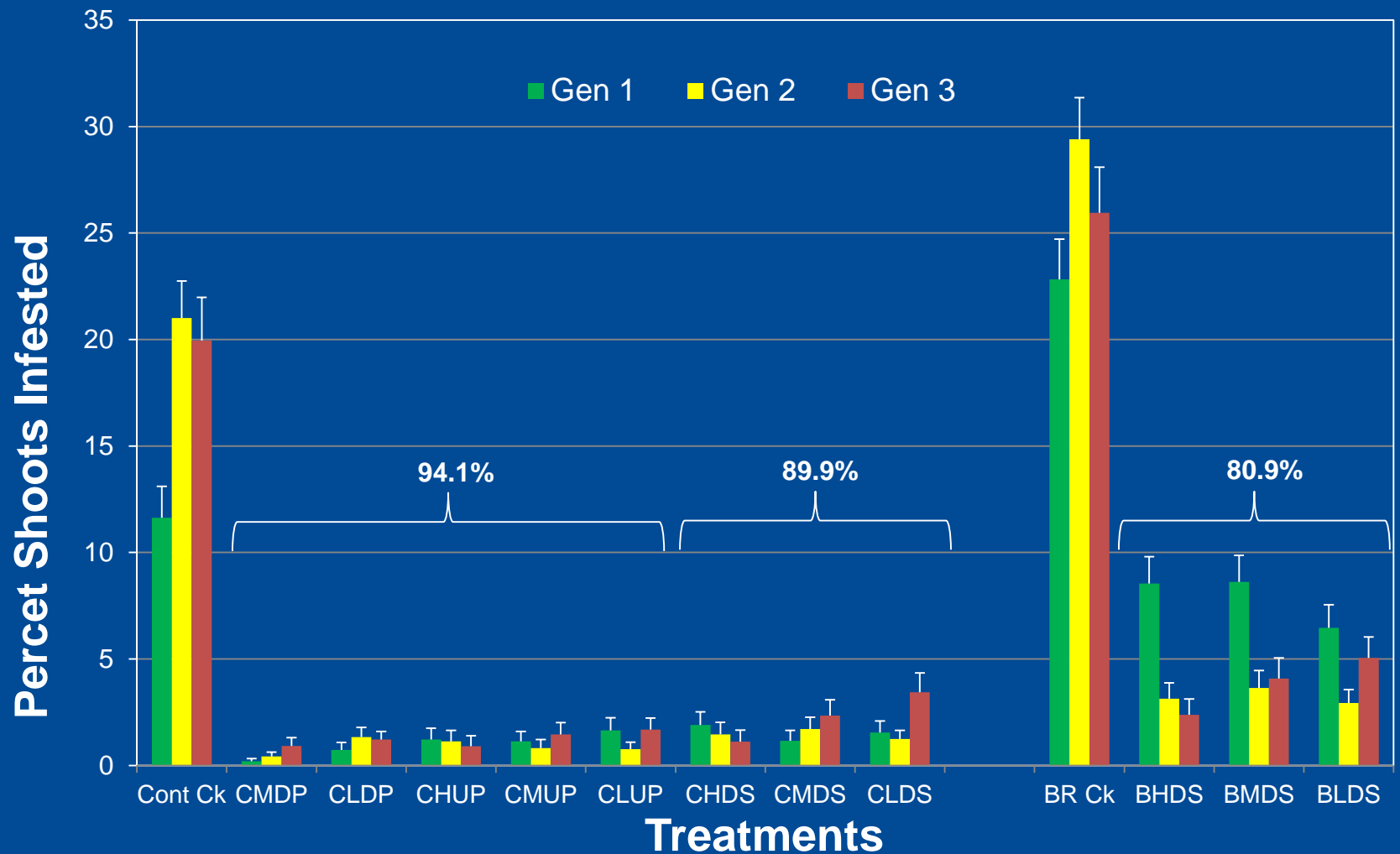
Site Distribution - 2011



Root-ball versus Soil injection Treatment



10 sites: Gen 1-3, 2011



C= Containerized; B= Bareroot; L= Low rate; M= Medium rate; H= High rate; D= Dilute; U= Undilute; P= Plug injection; S= Soil injection

Tracking Progress

End of Year 1



End of Year 2



Mid-Year 4



Tracking Progress



3 1/4



Container 3ml Q clone

4 3/4



Container 15ml Q clone

2 3/4



Container Check Q clone

Tracking Progress

3 +



Bareroot Soil Inj Q clone

2 +



Bareroot Check Q clone

Results



- PTM placed in the plant hole or as a root-ball injection work best and for the longest duration (3+ years)
- PTM applied after planting is best placed shallow (4 inches deep) and at higher rates (30 ml). Duration of control is reduced (<2 years) compared to plant hole treatments
- Operational treatments in conjunction with machine planting have been inconsistent. Work is needed to improve the machine planter system
- Root-ball injection of containerized trees, treated in the nursery eliminates the field application cost and provides immediate protection

Pine Bark Aphid

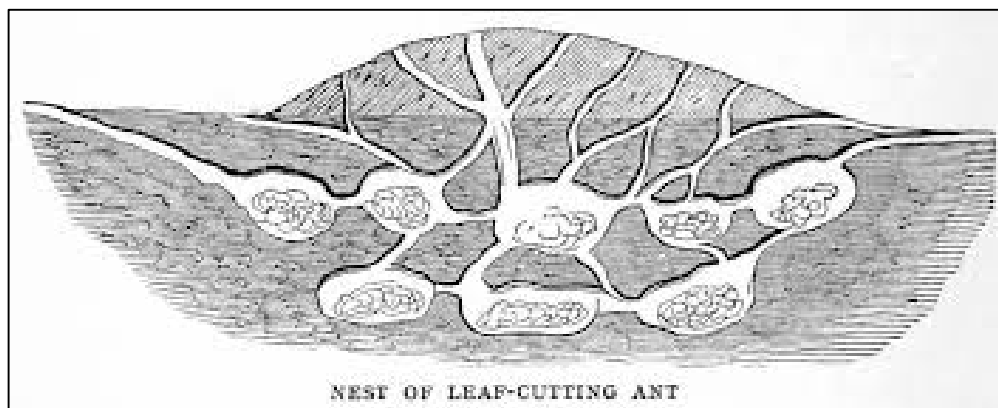


- PTM controls all species within the genus Cinara
- Based on the states where PTM is labeled, the most likely species to protect is white pine
- Does little damage to healthy trees, however heavy infestations in plantations in NC resulted in reduced growth measured 2 years after planting.

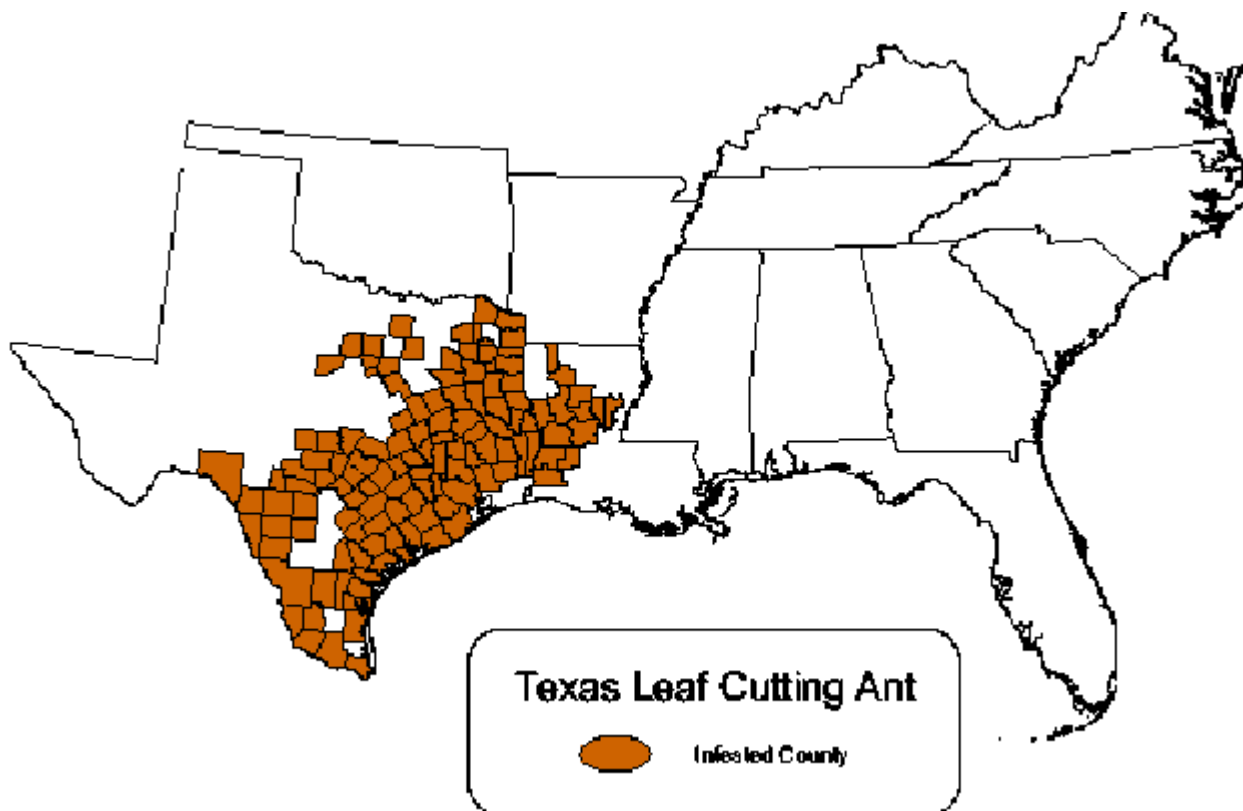
Pine Bark Aphid



Leaf Cutter Ants



Leaf Cutter Ants



Red Imported Fire Ants

PTM
INSECTICIDE



Fire Ants



Leaf Cutter and Fire Ant Control



Leaf Cutter Ant and Red Imported Fire Ant Control in Pine Seedling Plantations

Make a 2% dilution of **PTM Insecticide** in water. Refer to **Table 3**.

For leaf cutter ant control, inject 1.5 fl ozs of the dilution at least 3 inches below ground into each leaf cutter ant exit hole.

For red imported fire ant control, inject 3 fl ozs of the dilution at least 3 inches below ground divided among 2 injections for small colonies (mounds 12 inches wide or less) or 4 injections for larger colonies (mounds more than 12 inches wide).

DO NOT apply more than 21 fl ozs **PTM Insecticide** per acre per year.

Leaf Cutter and Fire Ant Control



Table 3. 2% Dilutions for Leaf Cutter Ant and Red Imported Fire Ant Control

Total Volume (gals)	PTM (fl ozs)	Water (fl ozs)	Leaf Cutter Ant Exit Holes to Treat	Red Imported Fire Ant Mounds to Treat
1	2.6	125	85	43
2	5.2	250	170	85
3	7.8	375	255	128
4	10.4	500	340	170
5	12.8	625	425	213

PTM Summary



- Root-ball injection (containerized) provided, immediate, consistent, long-term control
- Injection into the planting hole provided long-term control but allowed damage from the first generation of tip moth
- Injection after planting, in the vicinity of the root zone, provides shorter term control and allowed damage from the first generation of tip moth
- Injection into the mounds for Leaf Cutter and Imported Fire Ants provided consistent control
 - ▶ Note that re-infestations can occur from outside treatment area

Questions?

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