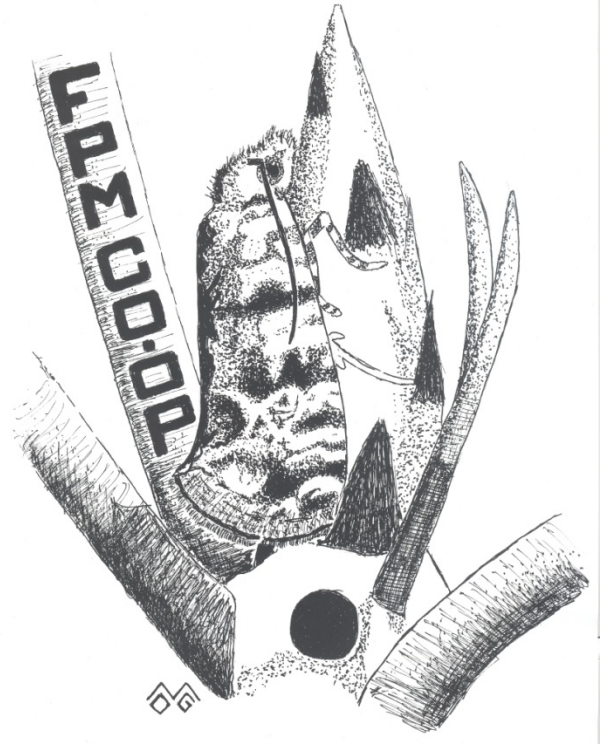
FOREST PEST MANAGEMENT COOPERATIVE

2012 Executive Committee Meeting #2



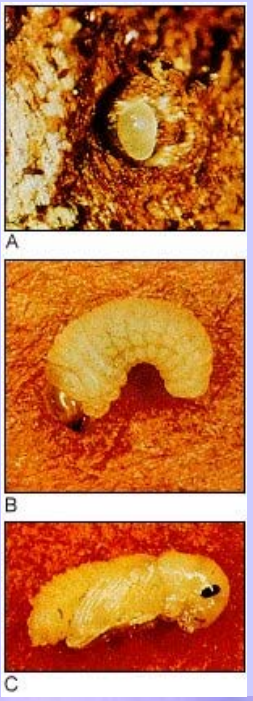
December 13, 2012
Lufkin, TX

Agenda

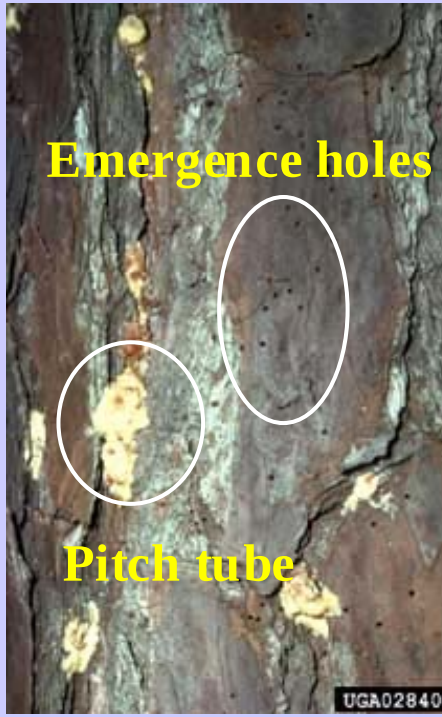
- Introductions.
- Discussion on the hiring of a new Coop Coordinator and the future plans for the Cooperative
- New Pest Activity in 2012
- Quick Overview of Recent FPMC Accomplishments & New Projects

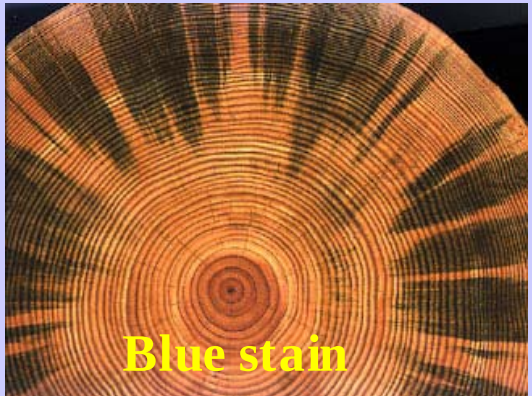
Southern Pine Beetle
Dendroctonus frontalis

SPB life stages



New Activity In 2012!





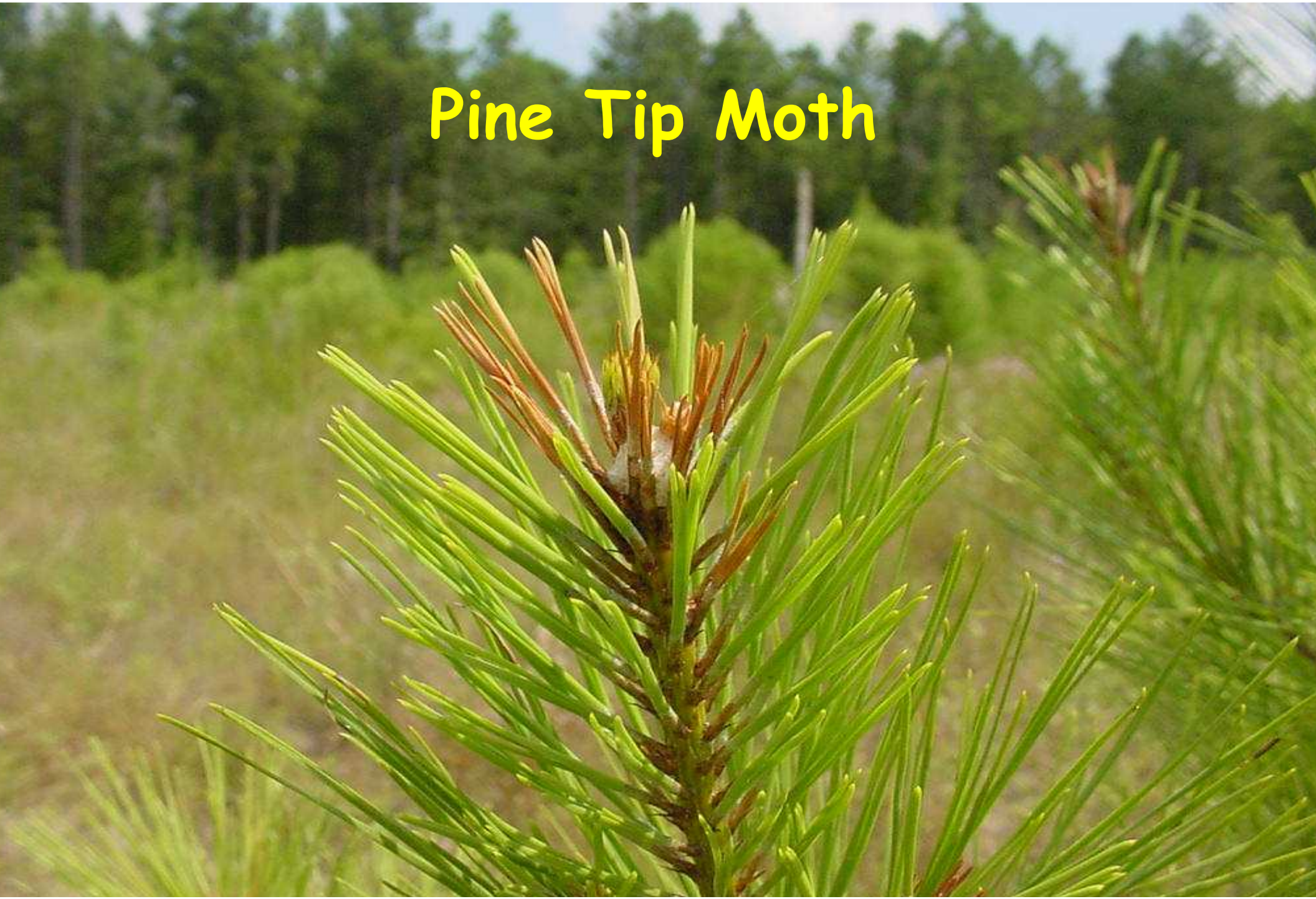
2012 SPB Activity

- Outbreak developed quickly in Mississippi.
- Nearly 800 spots in Homochitto NF (+100 more nearby)
  - 400+ have required control
- An additional 76 & 43 spots were found on Bienville and Tombigbee NFs, respectively.

FPMC Research Projects - 2012

Pine Tip Moth
Conifer Mites
Seed Bugs
Bark Beetles (Ips, SPB, MPB, WTB, BTB)
Disease (Oak Wilt, Hypoxylon, PWN)
Leaf-cutting Ants
Others

Pine Tip Moth



Tip Moth Impact and Hazard-Rating: 2001 - 2012

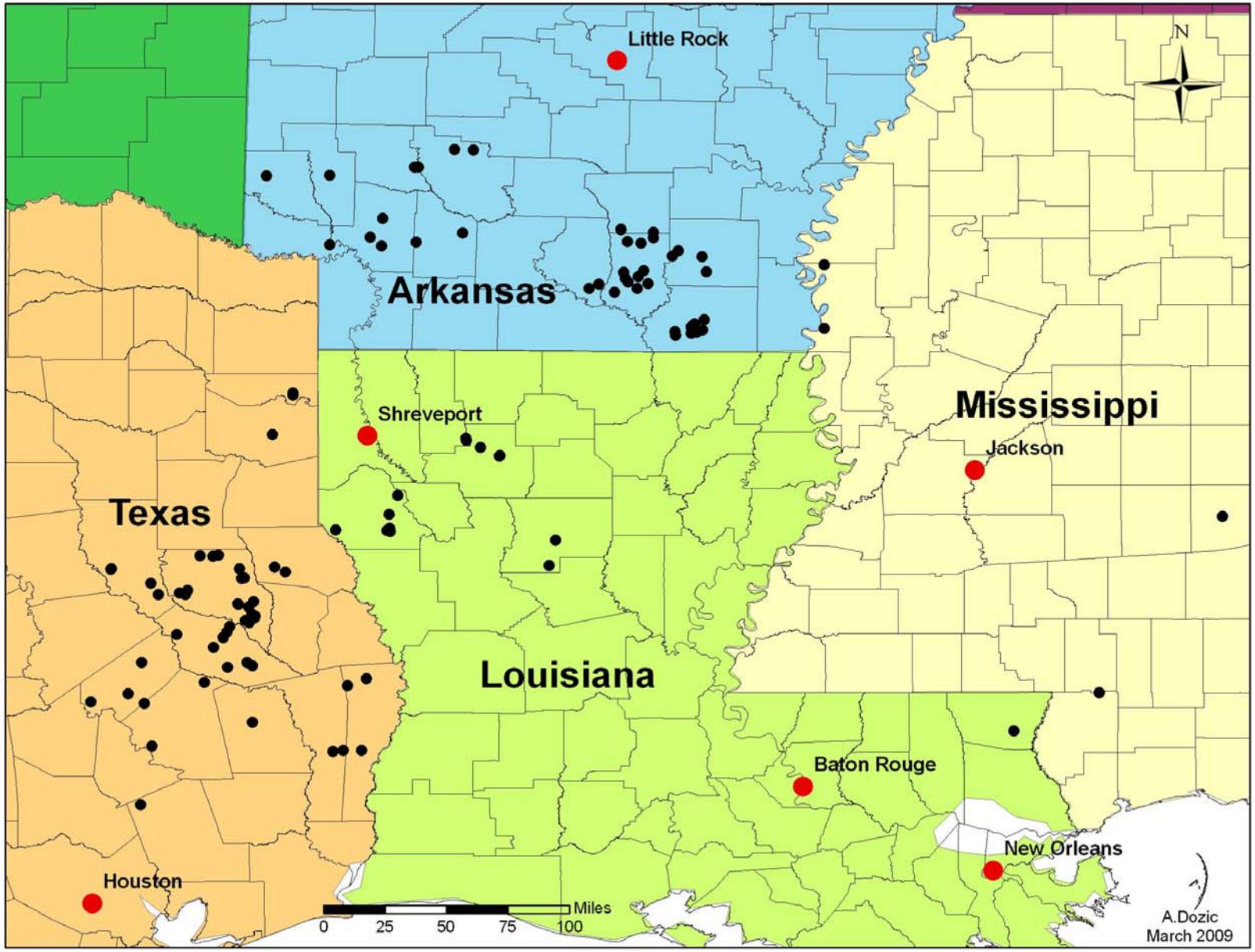
Objectives

- Determine impact of tip moth on height and diameter growth and form of loblolly pine.
- Identify abiotic factors that influence the occurrence and severity of tip moth damage.

Tip Moth Impact and Hazard Rating

- 110 impact + hazard-rating plots established on 76 sites from 2001 – 2010. An additional 32 hazard-rating plots only were established during this period.
- As tip moth damage increases (0 – 10, 11 – 20, >20%) differences in growth between protected and unprotected trees also increase.
- Analysis was completed by Mr. Trevor Walker and Dr. Dean Coble, SFASU, on cost/benefit analysis and hazard-rating model development.

Impact (110) & Hazard Rating (142) Sites



Conclusions on Impact

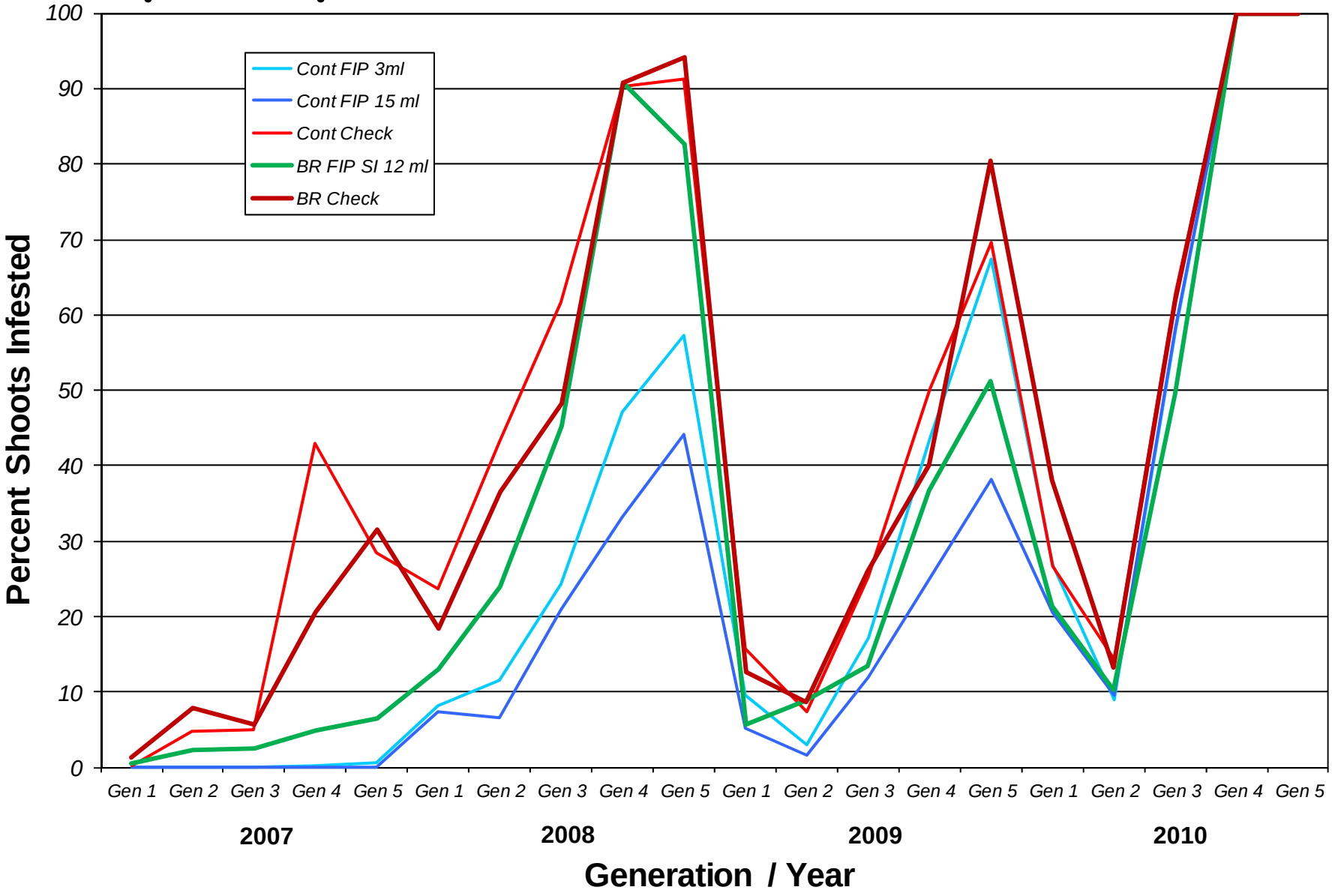
The impact of pine tip moth on tree height and diameter was greatest around age 5, after which the growth parameters of treated and check trees began to converge.

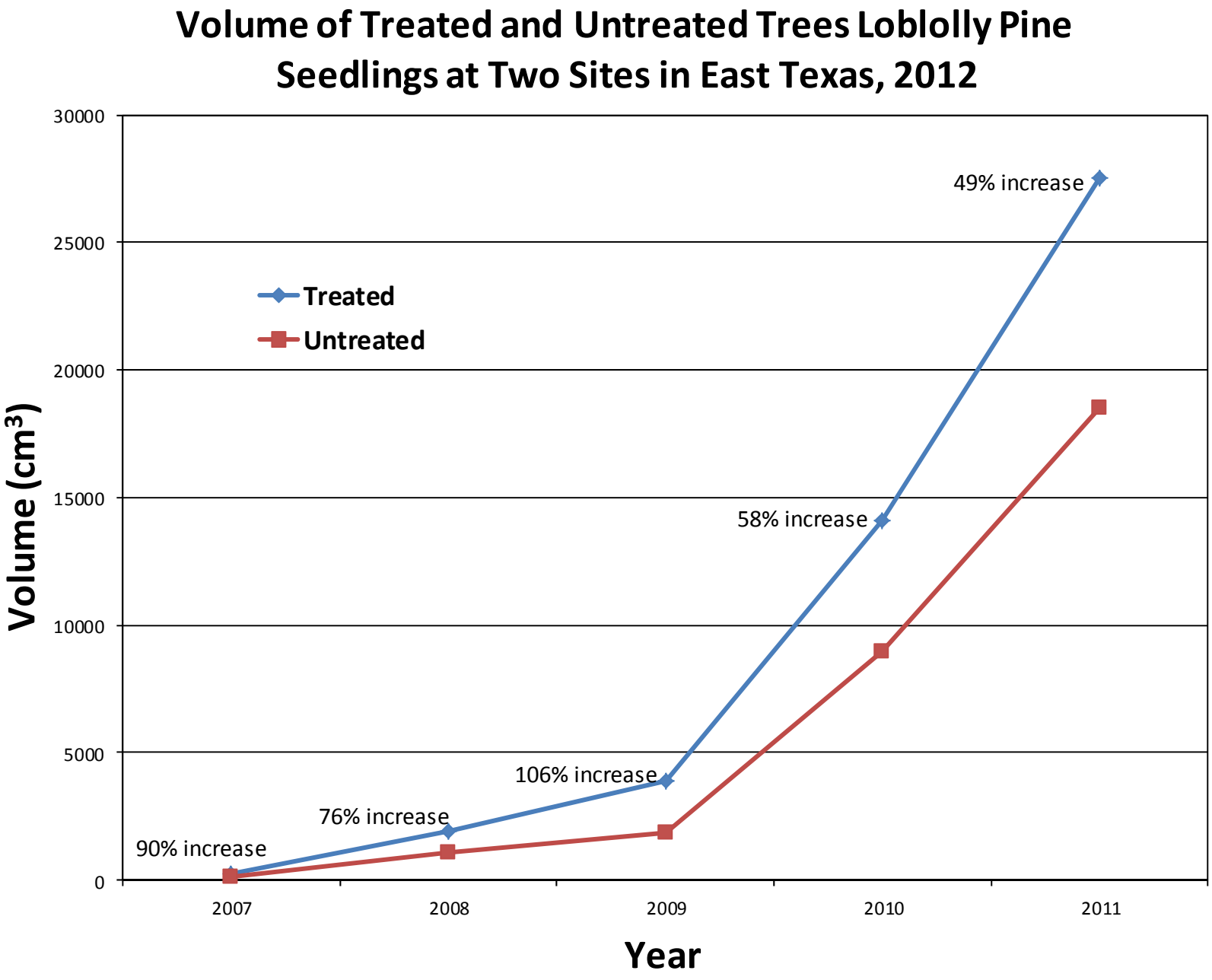
The response of the trees to the tip moth protection treatment was most evident for sites where check trees had greater than 40% of their terminals infested.

Effects of Tip Moth on Stem Quality

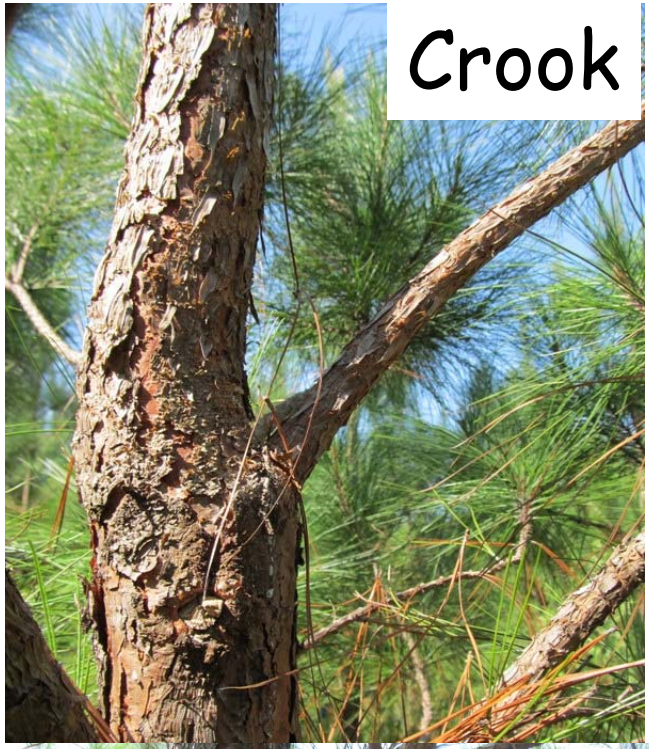
- Shoot mortality results in reduced height growth and stem volume and an **increase in compression wood and deformity of the main stem (forking, crooks, and/or ramicorn branches)**

Effects of fipronil soil treatment on infestation of containerized and bareroot loblolly pine by pine tip moth on 2 sites: 2007 - 2010

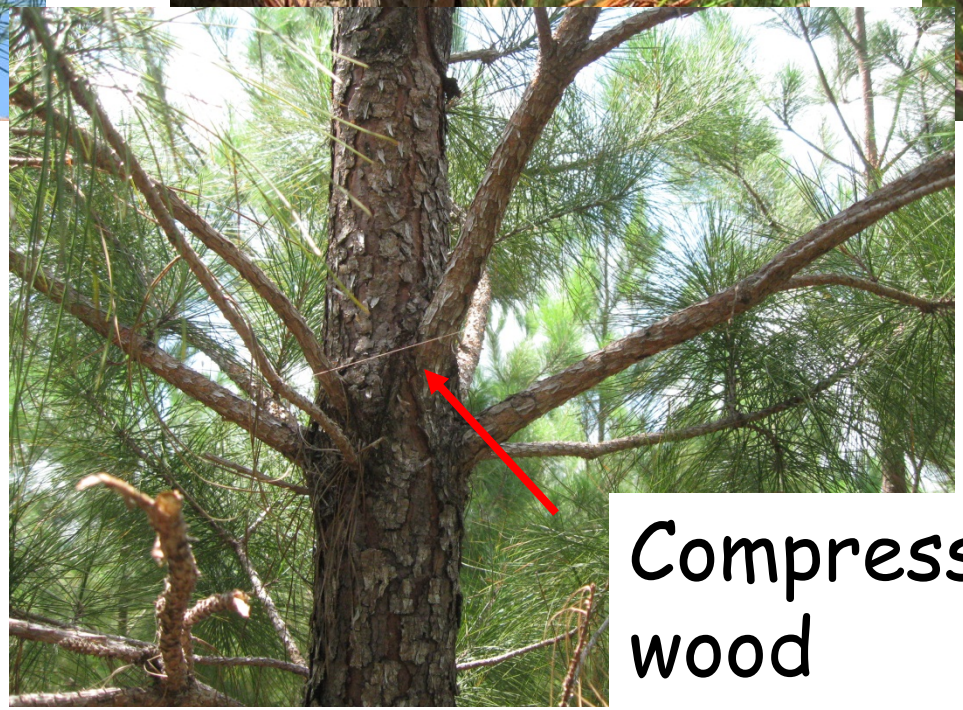



Volume of Treated and Untreated Trees Loblolly Pine Seedlings at Two Sites in East Texas, 2012
30000
25000
20000
15000
10000
5000
0
Volume (cm³)
Treated
Untreated
49% increase
58% increase
106% increase
76% increase
90% increase
2007
2008
2009
2010
2011
Year

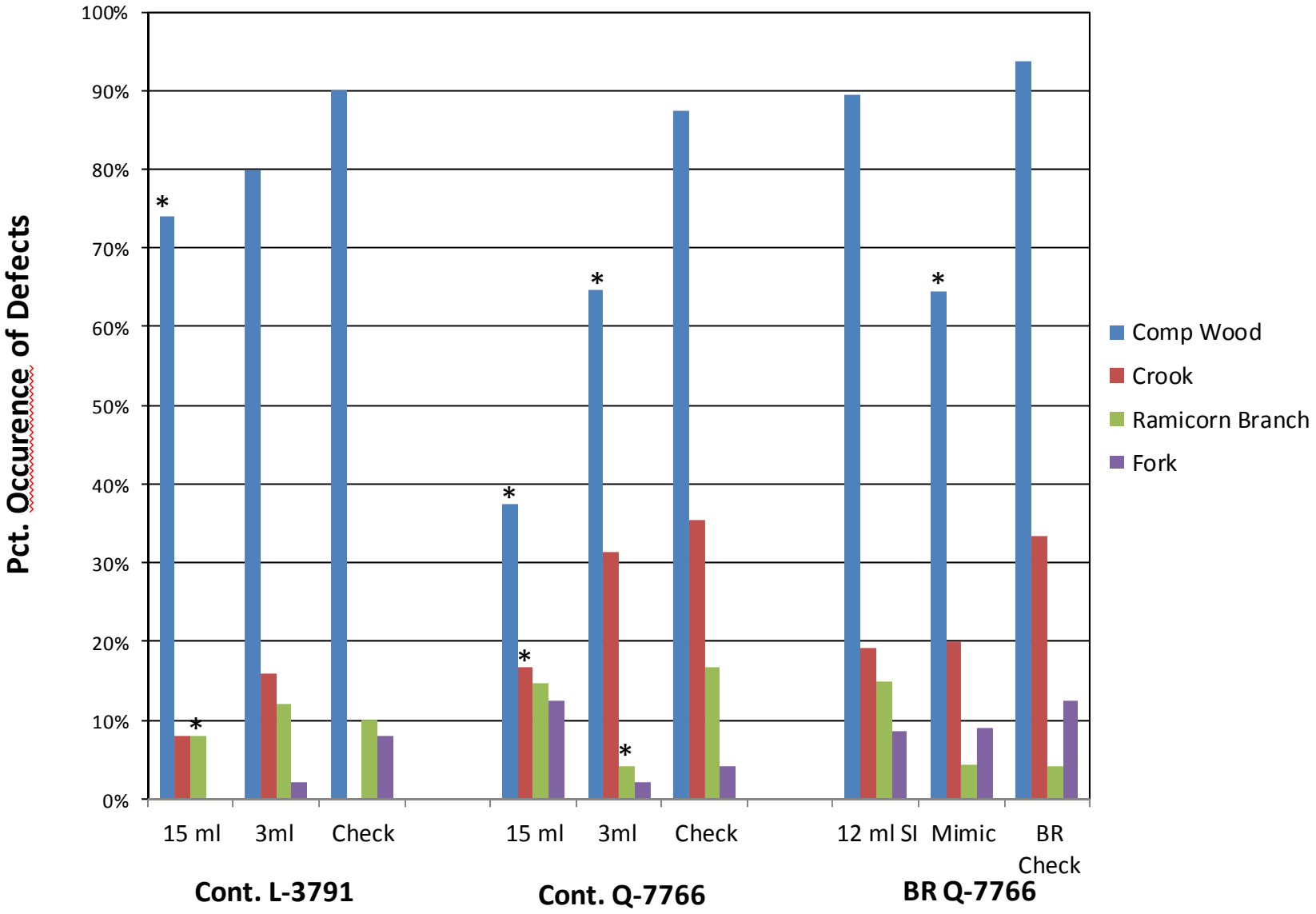

Fork


Crook

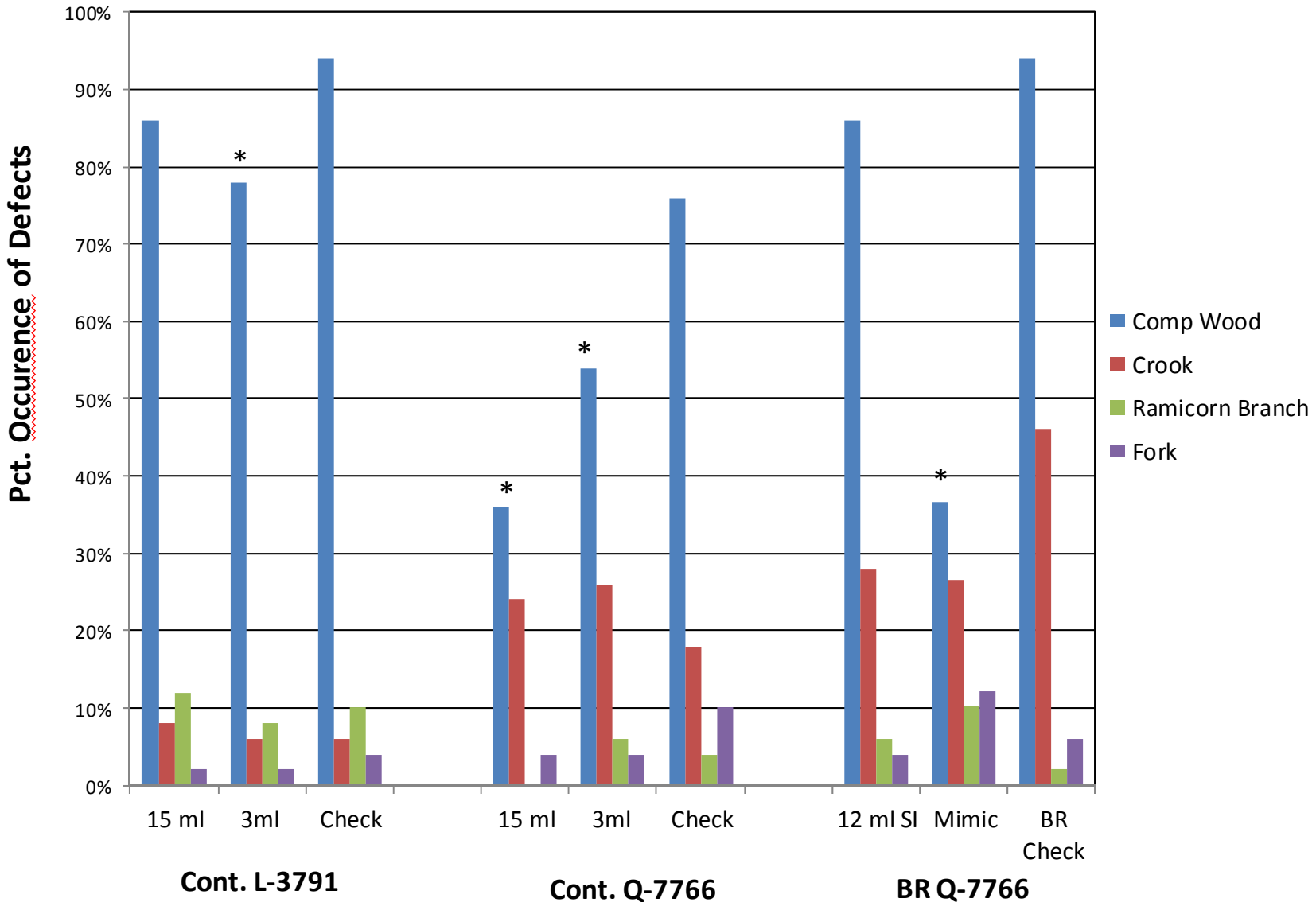

Ramicorn
branch


Compression
wood

Effect of PTM on the Presence of Defects in Containerized and Bare Root 5 Year Old Pine Trees in Angelina Co. Texas, 2012



Effect of PTM on the Presence of Defects in Containerized and Bare Root Loblolly Pine Trees in Polk Co. Texas , 2012.



Conclusions

- Tip moth also has a significant impact on stem quality of clonal seedlings, particularly on the occurrence of compression wood. Additional evaluations of tree form are needed later in the rotation.

- Impact on tree form in natural stands may be greater.

Identification of Influential Site and Stand Variables

- Results suggested that texture and drainage class were potentially influential, although the extent of which could not be isolated.
- An enhanced protocol was developed around these two factors to further investigate hazard rating

Extended Hazard-Rating Study

- Sixty sites matching matrix criteria identified within 60 miles of Lufkin, TX
- Tip moth damage from 5th generation evaluated within 1/8 acre plot at each site between Nov. 2011 and March 2012.
- Data analyzed by Trevor Walker.

		Soil Texture (Based on NRCS) @ 5-10"		
		Sand	Loam	Clay
Texture Description		Loamy Sand, Loamy Fine Sand, Sandy, Loamy Very Fine Sand, Fine Loamy Sand	Loam, Fine Sandy Loam, Very Fine Sandy Loam, Clay Loam, Fine Sandy Loam, Sandy Clay Loam, Sandy Loam, Silt Loam	Clay, Sandy Clay, Silty Clay
Drainage Class	Somewhat Excessively Drained	44,74,75,76,77,78, 81,82,88,89		
	Well Drained	23,23,37,44,48,49, 74,77,19,86,93	18,19,34,42,52,53,76, 80,88,90,92,93,95,96	2,5,12,18,35, 39,52,88,93,96
	Moderately Well Drained	45,49,54	3,9,17,19,24,34,36,39,41, 42,43,45,46,51,52,53,78,96	3,8,9,17,25,38,40
	Somewhat Poorly/ Very Poorly/ Poorly Drained		31,2,3,3,8,10,12,16, 24,42,43,45,89,90	16,47,51

Walker's Conclusions

- Texture and the texture/drainage interaction influence tip moth infestation.
- Site index is important on clay sites and excessively drained sites.
- Higher planting density tended to reduce the odds of infestation.

Tip Moth Meeting
Athens GA
August 15-16, 2012

- Meeting with interested parties to discuss status of tip moth knowledge, identify areas of need, and if necessary coordinate future research.
- Participants (28) from 14 companies/agencies.

Tip Moth Meeting Summary

- General consensus is tip moth is important and that addition work is needed.
- The Coop members need to meet to discuss the validity of continuing with tip moth research.
- There needs to be direct benefits of tip moth research to the membership.
- Tip moth causes growth loss and deformity on loblolly pine at least in the short-term; the long-term effects are variable and still in question. What is the magnitude and duration of productivity loss?
- Coordinate with Coop members with mills to evaluate effects of tip moth damage on wood quality.
- Map tip moth damage levels across the South (data easily obtained while collecting survival data in fall).
- Need to determine the economics of tip moth damage.
- Need to work cooperatively with outside sources (university, Dr. King, etc.)
- Need more economical form of control; PTM and SilvaShield/CoreTect (in particular) too expensive per acre.
- We need a decision tool/model for tip moth control (perhaps building on Asaro's) that links a biological model to an economic model.
- Continue development of methods to treat seedlings (containerized and bareroot) in nursery.
- How do different families/clones respond to tip moth and treatments for insect damage?

Southwide Survey

- Seedling survival survey already conducted on all newly planted tracts.
- Have field techs survey 5 trees with each plot to determine number of terminals infested.
- In just a few years, we should be able to identify high risk areas across the South

Tip Moth Control

PTM™ Insecticide (fipronil)

- EPA approved Section 3 (Full) registration of PTM™ Insecticide in June 2007 for application during or post-planting of seedlings.
- C3M, Helena, ProSource, Red River Specialty and UAP are current distributors.
- Red River Specialty is selling PTM™ at $435 per gallon; can purchase in 20 oz ($68) and 2.5 gal containers ($1,088).
- Can only apply 21 oz of product per acre (chemical cost per acre is $71.37).
- No restriction on number of seedlings that can be treated. However, the lower the density – the higher the concentration per seedling.

Conclusions based on 2004 - 2010 trials

- PTM™ placed in plant hole or containers works best and for the longest duration (3+ years).
- PTM™ applied after planting is best placed shallow (4 inches deep) and at higher volumes (30 ml). Still, duration is reduced (< 2 years) compared to plant hole treatments.
- Operational treatments have been inconsistent. Work need to improved machine planter system.
- Application of PTM into containers in the nursery could reduce application costs.
- BASF is willing to extend PTM™ registration for use on containerized seedlings if EPA concerns are addressed.

PTM™ Applicators

PTM™ Spot Gun
$145 @
Red River Specialties

PTM™ Injection
Probe

NU – Arbor's
1 – Two Root Injector
$495 @ treecaresuppliers.com

Has Issues

Discontinued

2008

Day System - TX

Machine Planters Fitted with Soil Injection Systems

2011

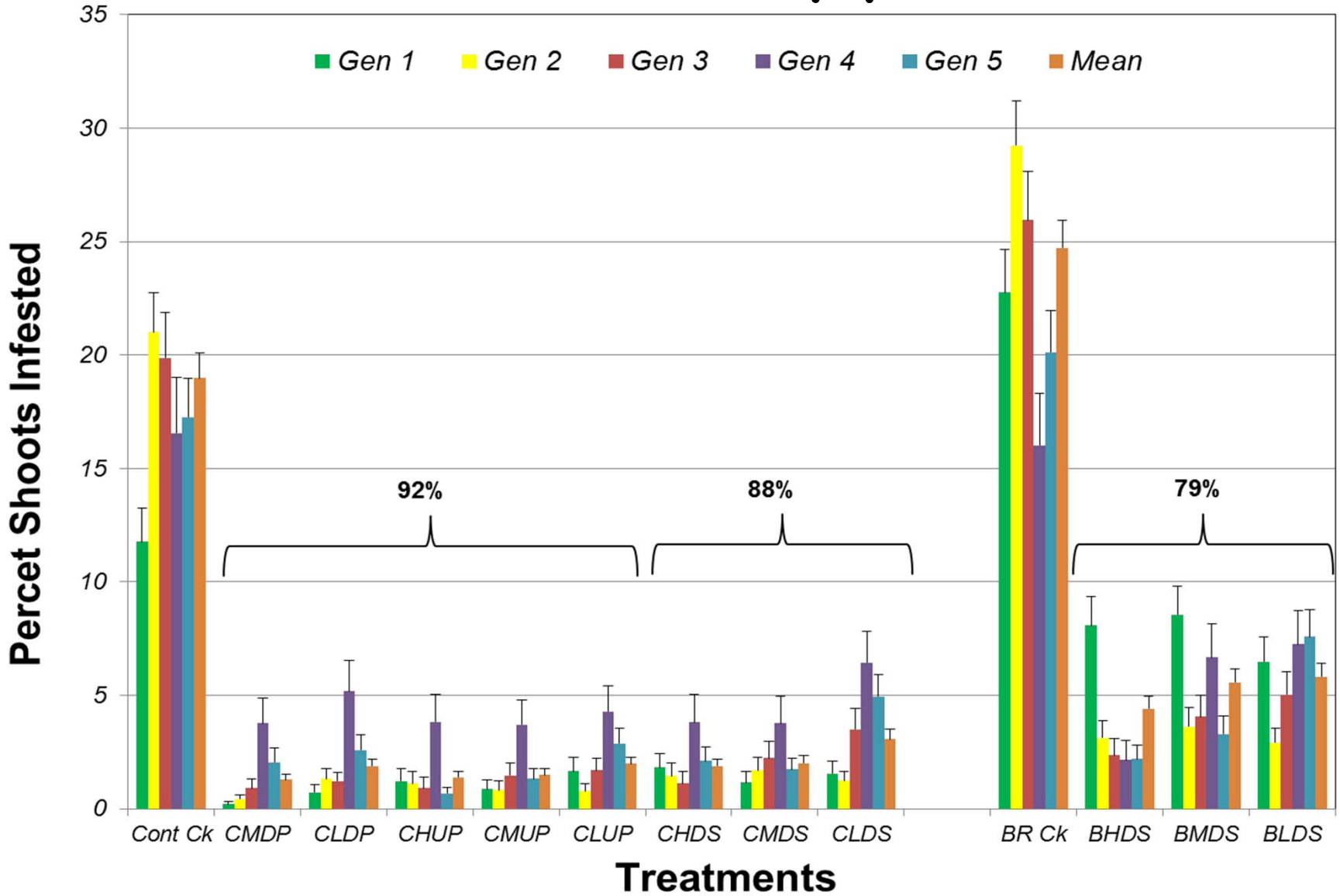
Dowden System - LA

PTM™ for Containerized Seedlings - 2011

	Pl	*Sl*	*Cont.*	*Bareroot*
• PTM (Hi UD)	X		X	
• PTM (Hi D)		X	X	
• PTM (Hi D)		X		X
• PTM (Med. UD)	X		X	
• PTM (Med. D)	X		X	
• PTM (Med. D)		X	X	
• PTM (Med. D)		X		X
• PTM (Low UD)	X		X	
• PTM (Low D)	X		X	
• PTM (Low D)		X	X	
• PTM (Low D)		X		X
• Check (Cont)			X	
• Check (BR)				X

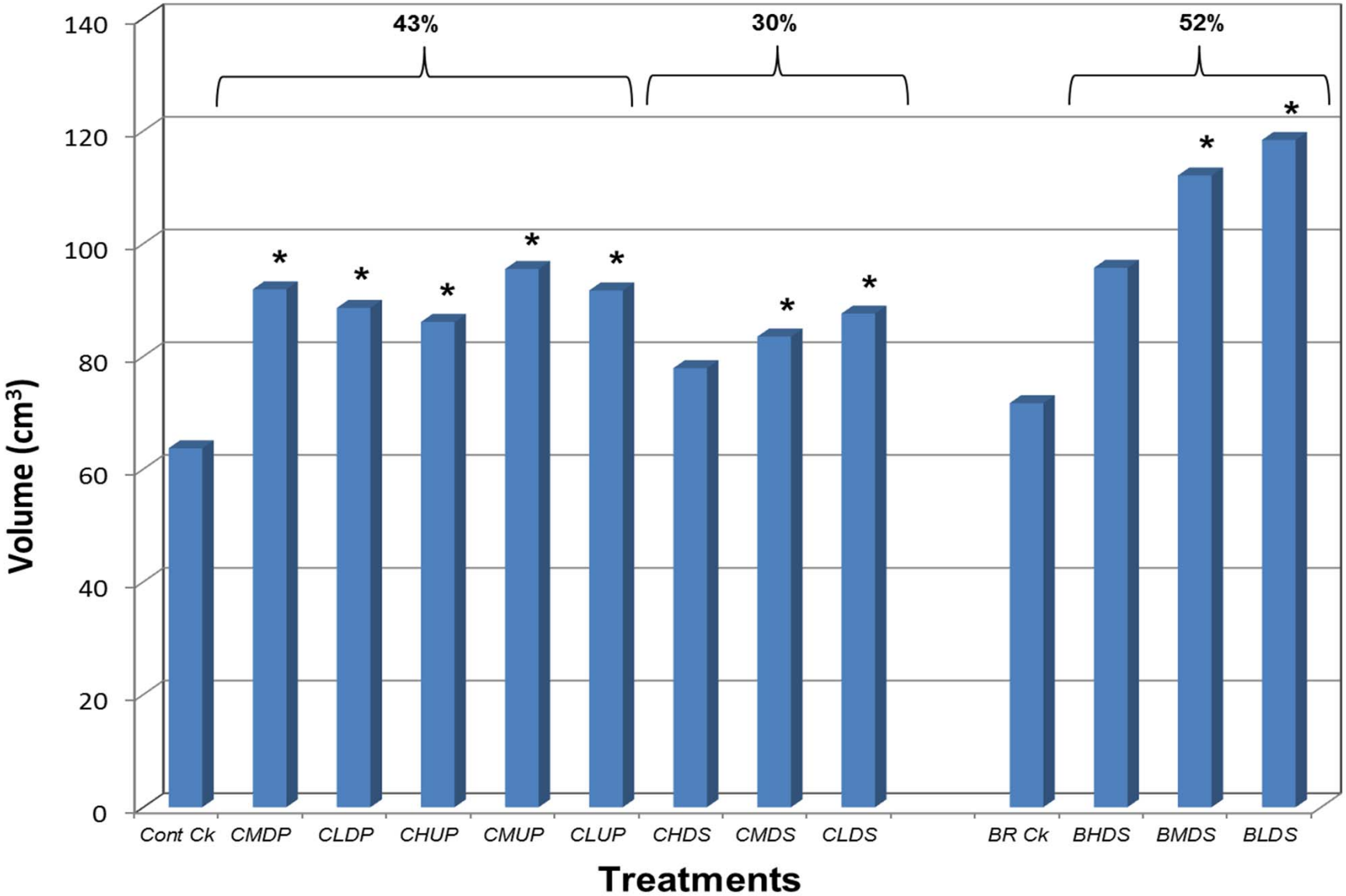
Plug Injection Trial – Site Distribution - 2011

Effects of fipronil treatments on tip moth damage on containerized and bareroot loblolly pine on 10 sites: 2011

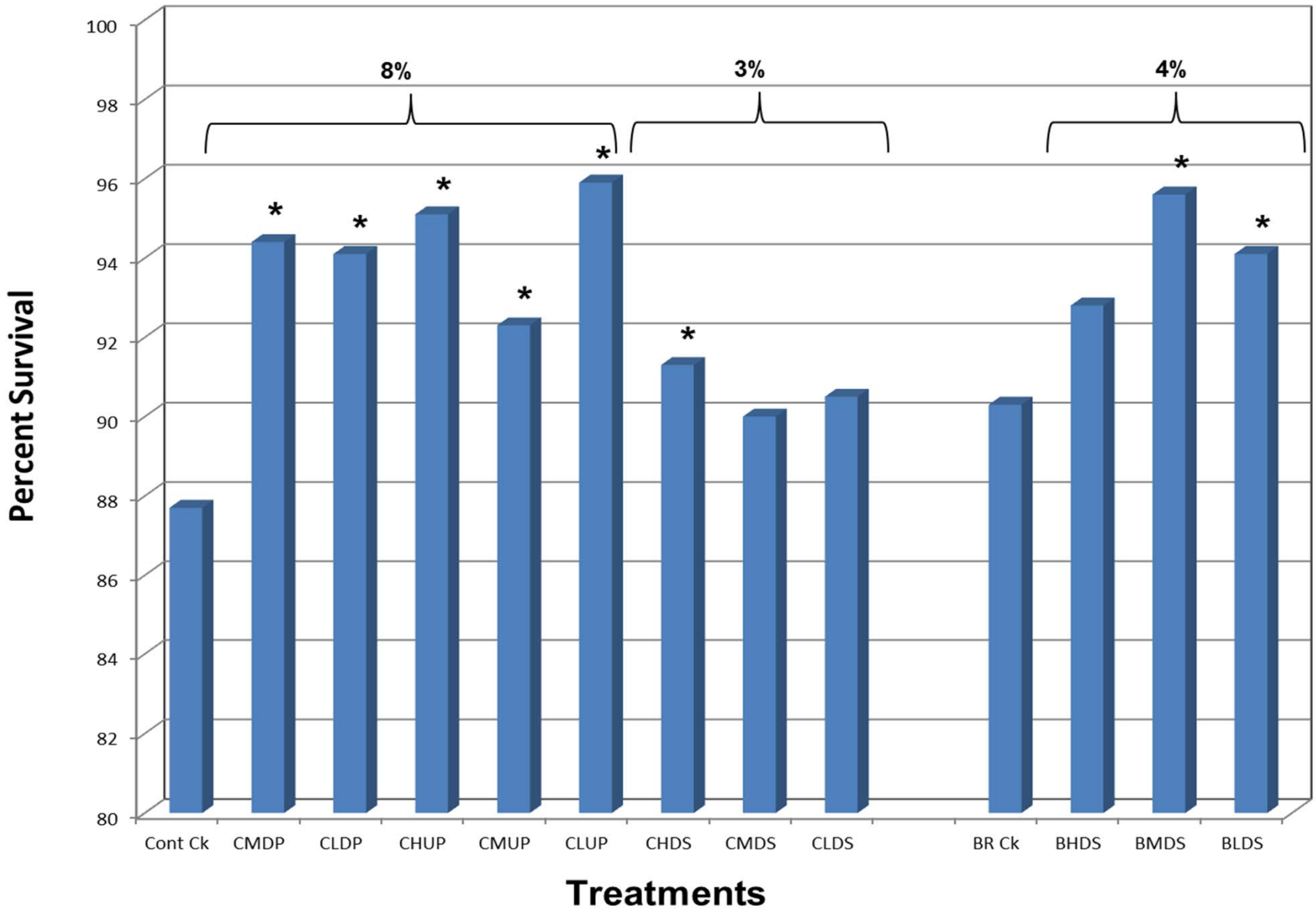


C= Containerized; B= Bareroot; L= Low rate; M= Medium rate; H= High rate; D= Dilute; U= Undilute; P= Plug injection; S= Soil injection

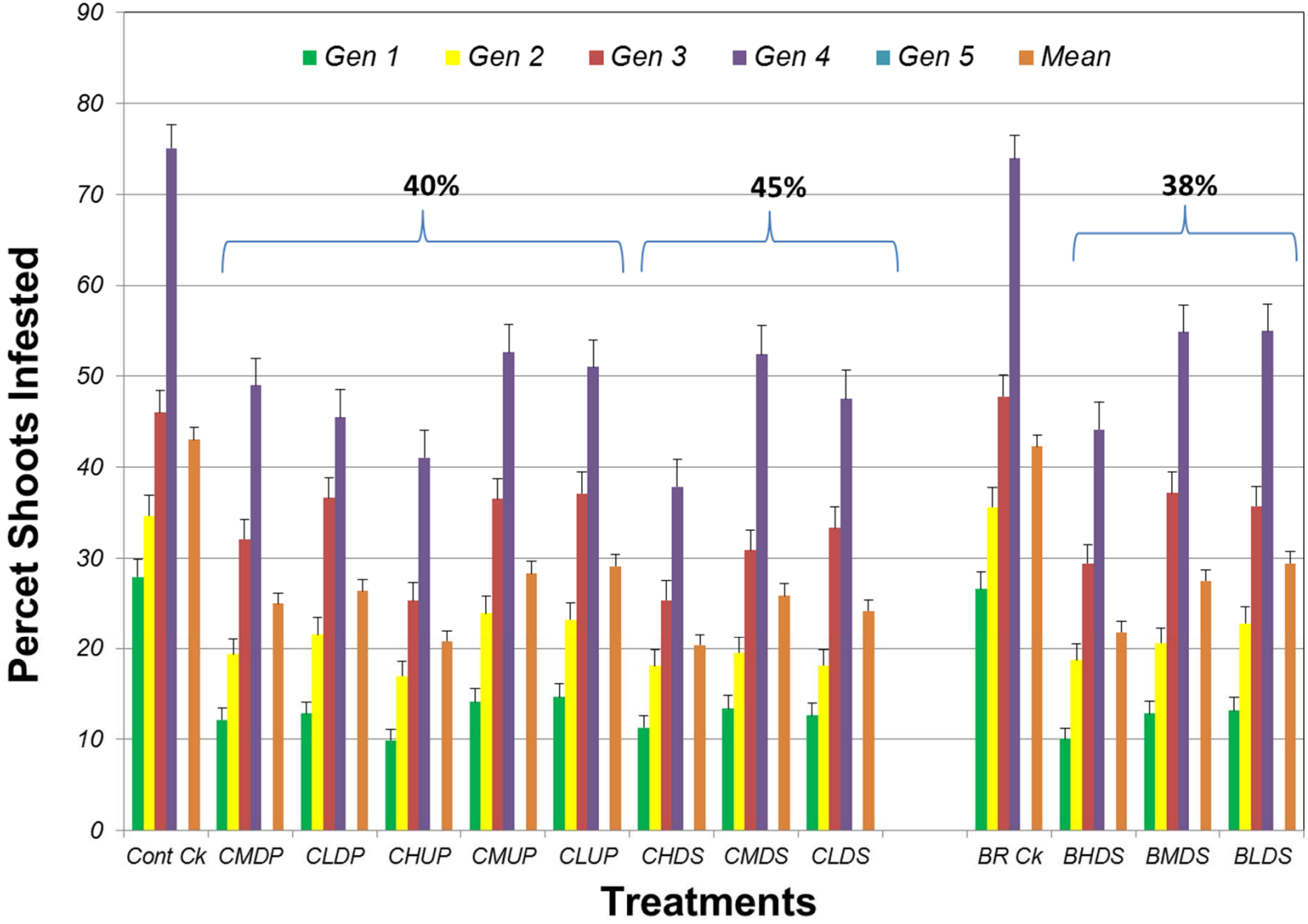
Effects of fipronil treatments on volume (cm^3) growth of containerized and bareroot loblolly pine on 10 sites: 2011



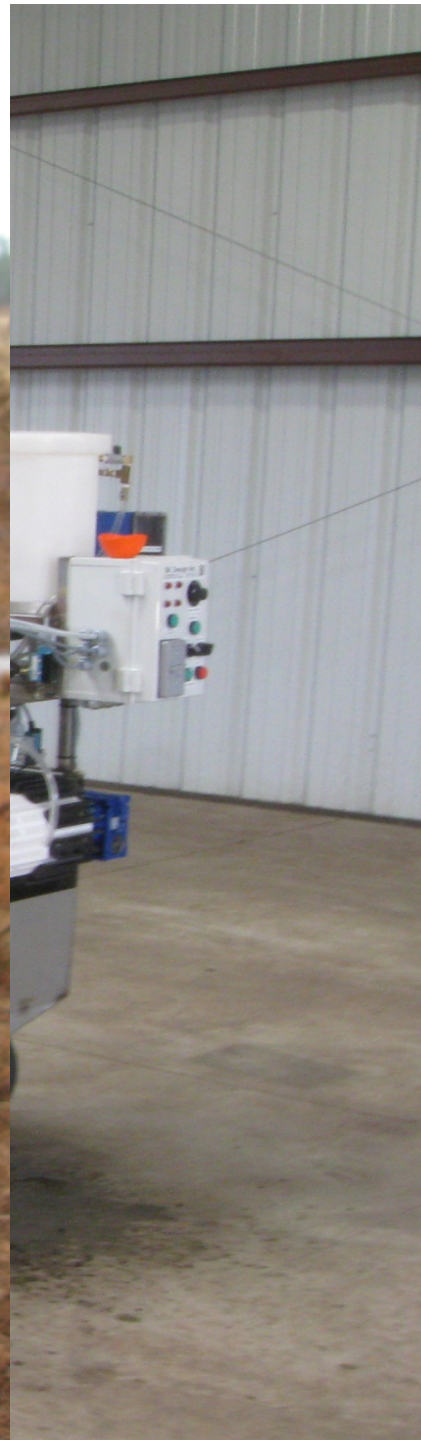
Effects of fipronil treatment on survival of containerized and bareroot loblolly pine on 10 sites: 2011



Effects of fipronil treatments on tip moth damage on containerized and bareroot loblolly pine on 9 sites: 2012



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

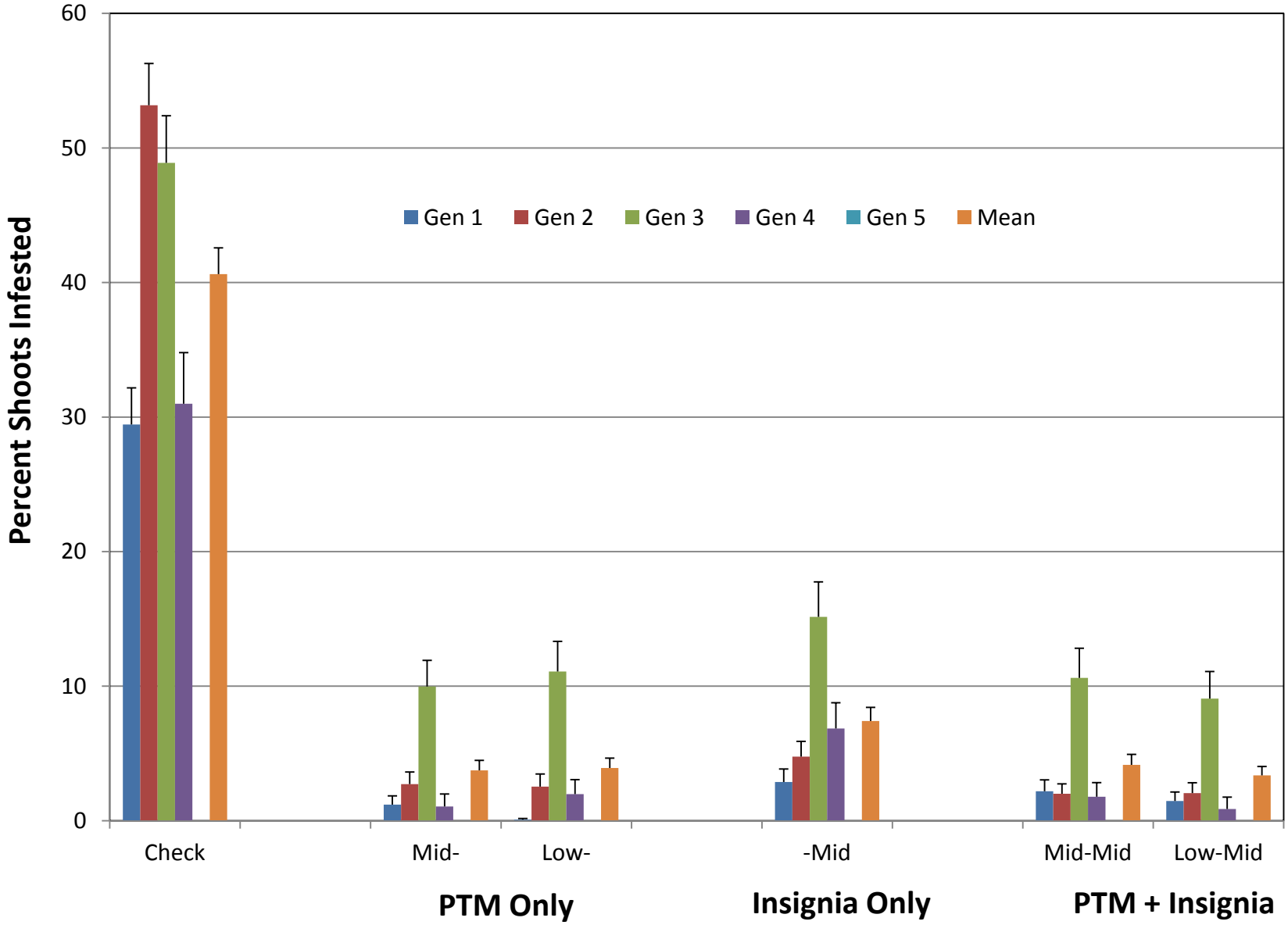


PTM™ & Insignia™ for Containerized and Bare Root Seedlings - 2012

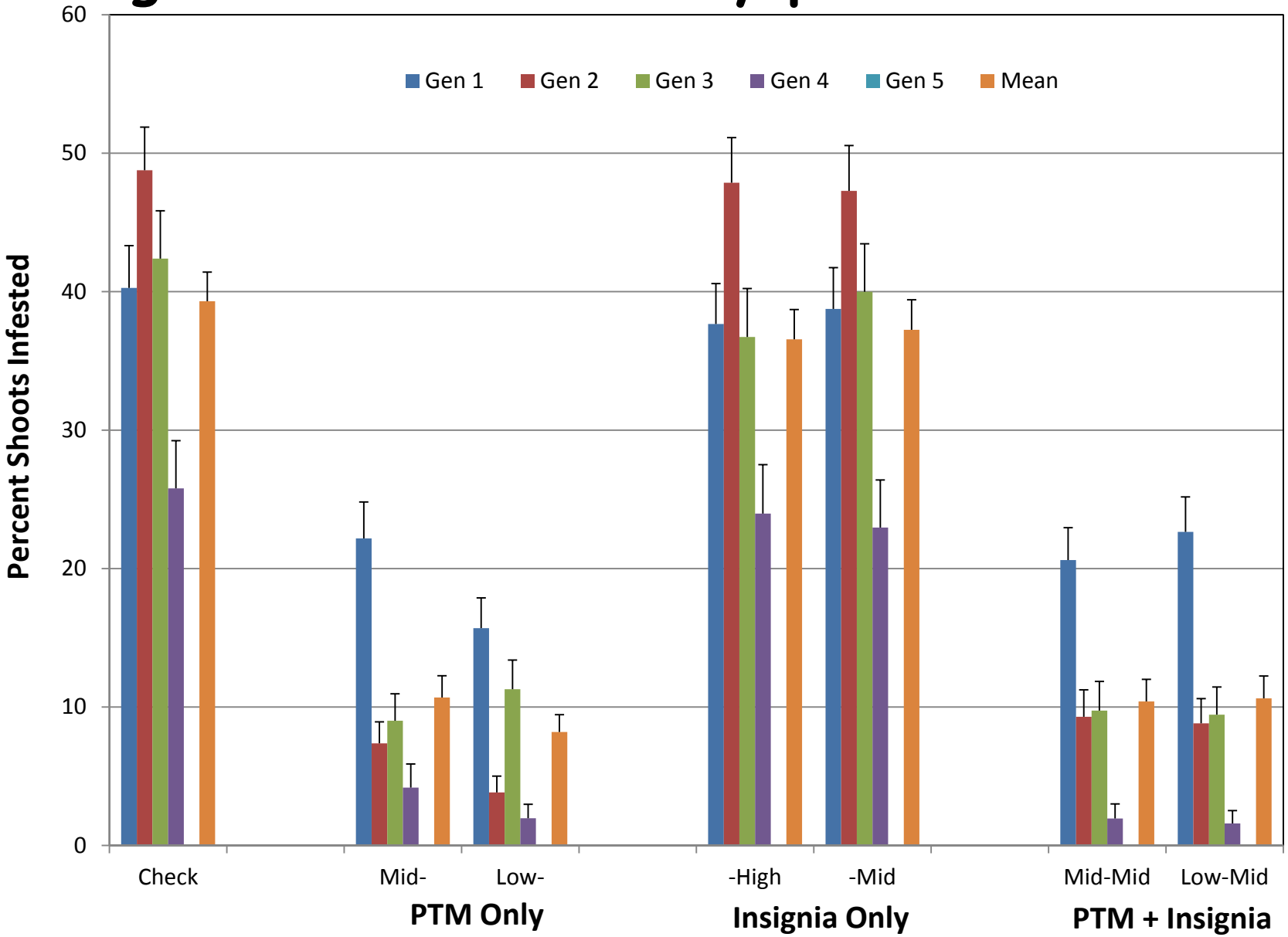
	PI	SI	Cont.	Bareroot
Insignia (Mid UD)	X		X	
PTM (Mid UD)	X		X	
PTM + Insig (Mid UD)	X		X	
PTM (Low UD)	X		X	
PTM (Low) + Insig (Mid)	X		X	
Insignia (High D)		X		X
Insignia (Mid. D)		X		X
PTM (Mid D)		X		X
PTM + Insignia (Mid D)		X		X
PTM (Low D)		X		X
PTM (Low) + Insig (Mid)		X		X
Check (Cont)			X	
Check (BR)				X

Containerized Plug Injection Trial Site Distribution in ● 2011 & ○ 2012

Effects of PTM ± Insignia treatments on tip moth damage on containerized loblolly pine on 5 sites: 2012



Effects of PTM ± Insignia treatments on tip moth damage on bareroot loblolly pine on 5 sites: 2012



Effects of Cold Storage Time on Fipronil Protection

Objectives: 1) Evaluate the effects of cold storage times on containerized seedling survival and 2) efficacy of PTM (fipronil) for reducing pine tip moth infestation levels.

Treatments:

A = PTM + Storage (4 wk)
B = PTM + Storage (2 wk)
C = PTM + Storage (1 wk)
D = PTM only (no storage)
E = Storage (4 wk) only
F = Storage (2 wk) only
G = Storage (1 wk) only
H = Check (untreated)

Four Latin Square replicates to be established on each of two sites (TX & GA); 36 trees / trt / site.

~~SilvaShield™ Forestry Tablet~~ CoreTect™ Tree and Shrub Tablet (imidacloprid)

- SilvaShield™/ CoreTect Tablet was registered with EPA in December 2006. It is now registered in all states, except CT, ME, WA, NJ, NY, OR.
- Helena, UAP and Red River Specialties are distributors.
- Red River Specialty is selling the ball tablet at ~$0.28 a piece ($340 per bag of 1200). The label restricts the number of tablets applied per acre to 450. This equates to $127.50 per acre.

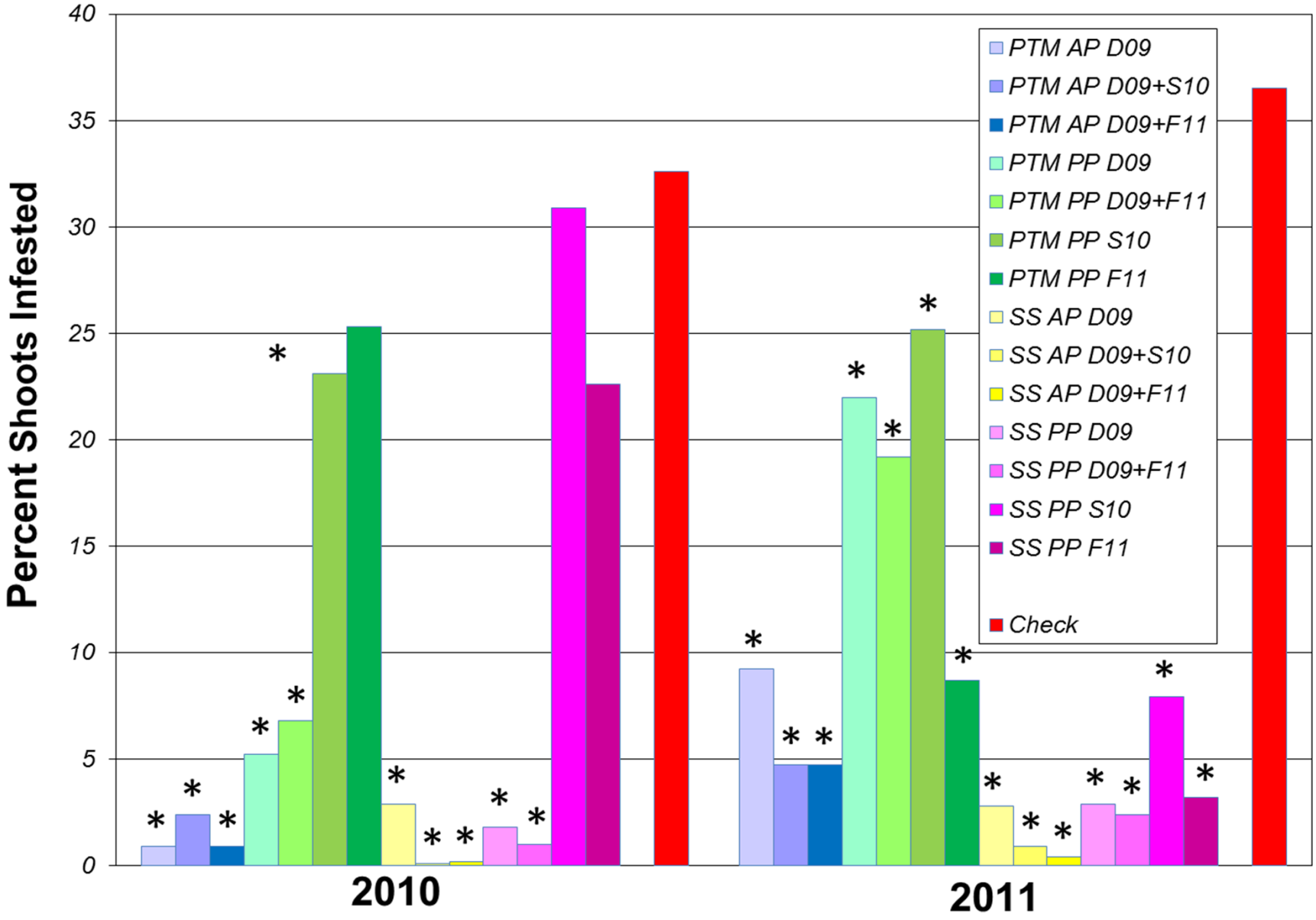
Conclusions

- SilvaShield™ Forestry Tablets can significantly reduce tip moth damage through the 3rd year after planting.
- Tablets placed in plant hole are more effective compared to those placed adjacent to seedling.
- Higher rates most effective for longest duration. Depth of tablet placement had no apparent affect.
- Tablets reduced tip moth damage and improved growth. Weed control and fertilization did not.
- Operational tablet treatments have been more effective and consistent compared to PTM™. Work is need to develop applicator system.

PTM™/SilvaShield™ Comparison - 2010

	AP	PP	Dec.'09	Sep.'10	Feb.'11
PTM	X		X		
PTM		X	X		
PTM		X		X	
PTM	X	X	X	X	
PTM		X			X
PTM	X				X
PTM		X	X		X
PTM	X		X		
SilvaShield	X		X		
SilvaShield		X	X		
SilvaShield		X		X	
SilvaShield	X	X	X	X	
SilvaShield		X			X
SilvaShield	X	X	X		X
SilvaShield		X	X		X
Check					

Effect of PTM™ and SilvaShield™ and timing on tip moth infestation: 2010 & 2011



* Significantly different from untreated check

EB Inj & Sprays for Tip Moth and Conifer Mites: 2012 & 2013

- Objectives: 1) Determine if emamectin benzoate injection and experimental sprays are active against tip moth and conifer mites and 2) determine duration of treatment efficacy.

- Treatments:
  10 trees each treated with:
  - Syngenta Exp. Product A10324 spray at 1x rate;
  - Syngenta Exp. Product A10324 spray at 2x rate;
  - Emamectin benzoate (2.5 ml/inch) tree injection;
  - Syngenta Exp. Product A18484C spray,
  - Conserve (spinosad) spray; and
  - Untreated control.

  Injections made in early Sept. Spray treatments applied in late Sept. and again 14 days later. Trees were evaluated for tip moth damage in mid-Nov.

EB Inj & Sprays for Conifer Mite: 2012 & 2013

- Objectives: 1) Determine if emamectin benzoate injection and experimental sprays are active against conifer mites and 2) determine duration of treatment efficacy.
- Treatments:
  10 trees each treated with:
  - Emamectin benzoate (2.5 ml/inch) tree injection;
  - Arborjet product DYM1 spray;
  - Arborjet product DYM2 spray;
  - Arborjet product DYM3 spray;
  - Arborjet product NSM spray; and
  - Untreated control.

  Injections made in early Sept. Spray treatments applied in mid Sept. Trees are being evaluated for number of mites every 7 days.

Research Efforts in 2010

Seed Orchard

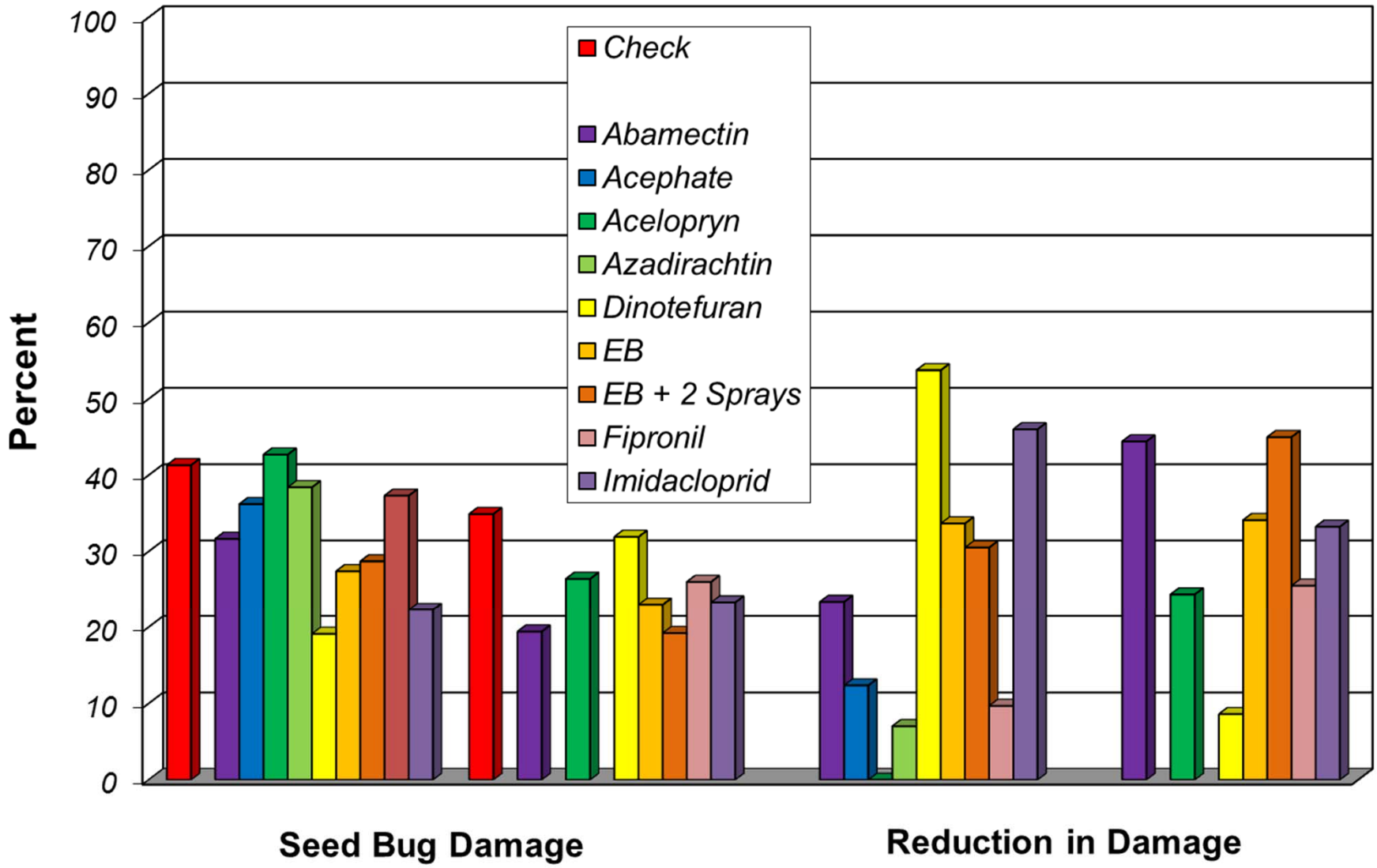
- Objective – Continue to evaluate potential products for protection of seed crops against pine seed bugs.

- Injected seed orchard trees with several different systemic insecticides at ArborGen's Woodville TX orchard.

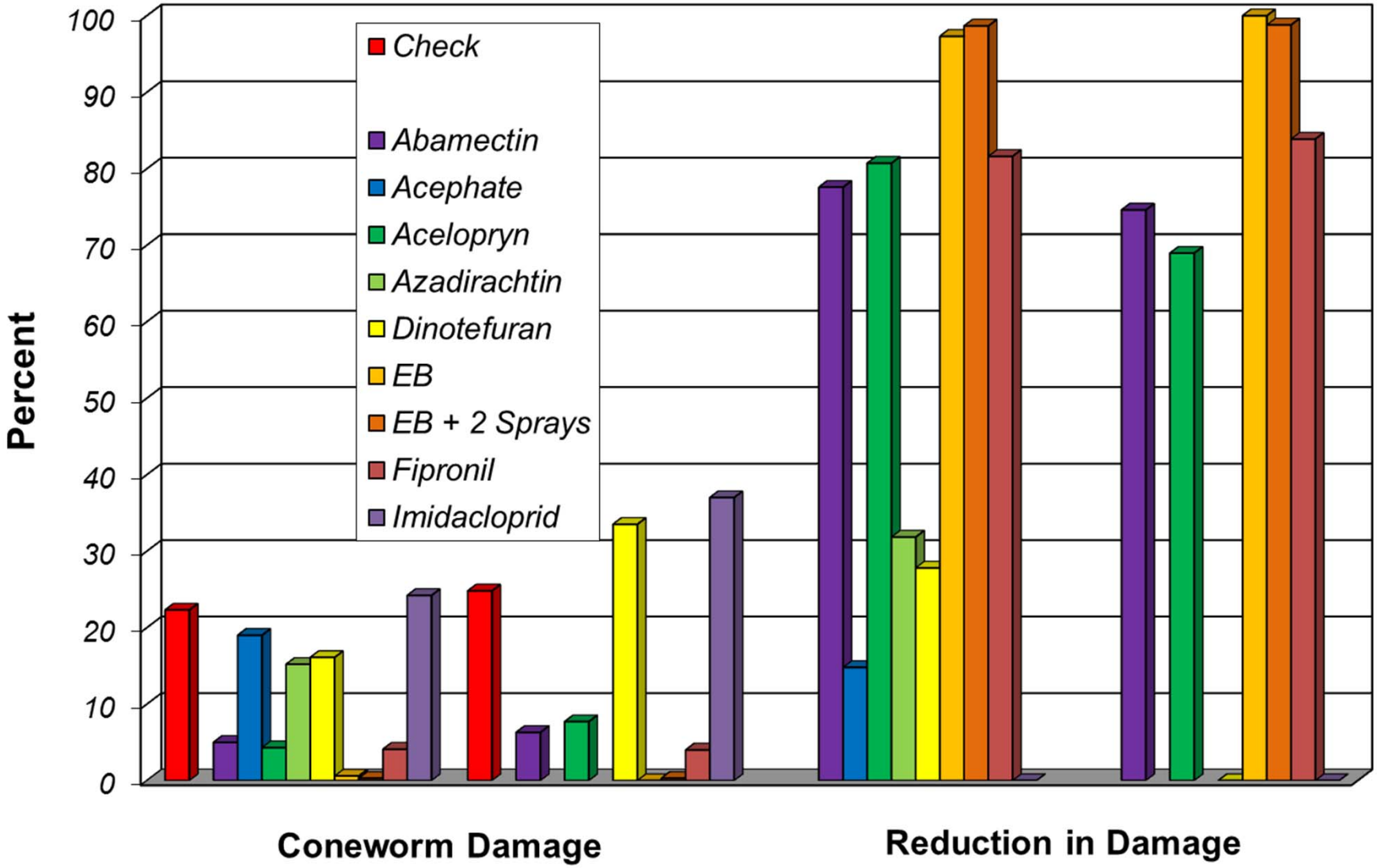
Woodville, TX 2010

	Oct. '09		Apr. '10	Aug. '10
Imidacloprid	X			
Emamectin benzoate	X			
Abamectin	X			
Chlorantraniliprole	X			
Fipronil	X			
Azadiractin	X			
Dinotefuran			X	
Acephate			X	
Emamectin benzoate	X	2 foliar sprays	X	X
Check				

Percent seed bug (*Leptoglossus* and *Tetyra* sp.) damage to second year cones, Woodville, TX 2010 & 2011



Percent coneworm (*Dioryctria* spp.) damage and reduction in damage compared to check, Woodville, TX 2010 & 2011.



Potential Research Efforts in 2012 - 2013

- Continued to evaluate the duration of treatment efficacy in the 3rd year of TX seed bug trials.
- Evaluate spray timing for control of seed bug damage.
- Work to develop techniques for monitoring seed bug populations.

Systemic Injection for Bark Beetles: 2004 - 2011

Objective

- Evaluate and register alternative to bole sprays for protection of trees against bark beetles in seed orchards and residential sites.

Research Efforts in 2012

- Continue to monitor effects of abamectin (Abacide 2 and Aba Ultra) against *Ips* engraver beetles in TX.
- Complete evaluations of effects of EB and fungicides against SPB (AL) and MPB (UT).
- Complete monitoring of invasive trials.
- Complete evaluation of microinjection systems for ability to apply Alamo® (propiconazole) for protection of live oaks against oak wilt disease.
- Evaluate new technique for managing southern pine beetle at low populations using trunk injections of TREE-age™.
- Evaluate efficacy of TREE-age™ and Alamo® for protection of black walnut against walnut twig beetle and associated fungi.

Research Efforts 2011

Ips & Dendroctonus Trials

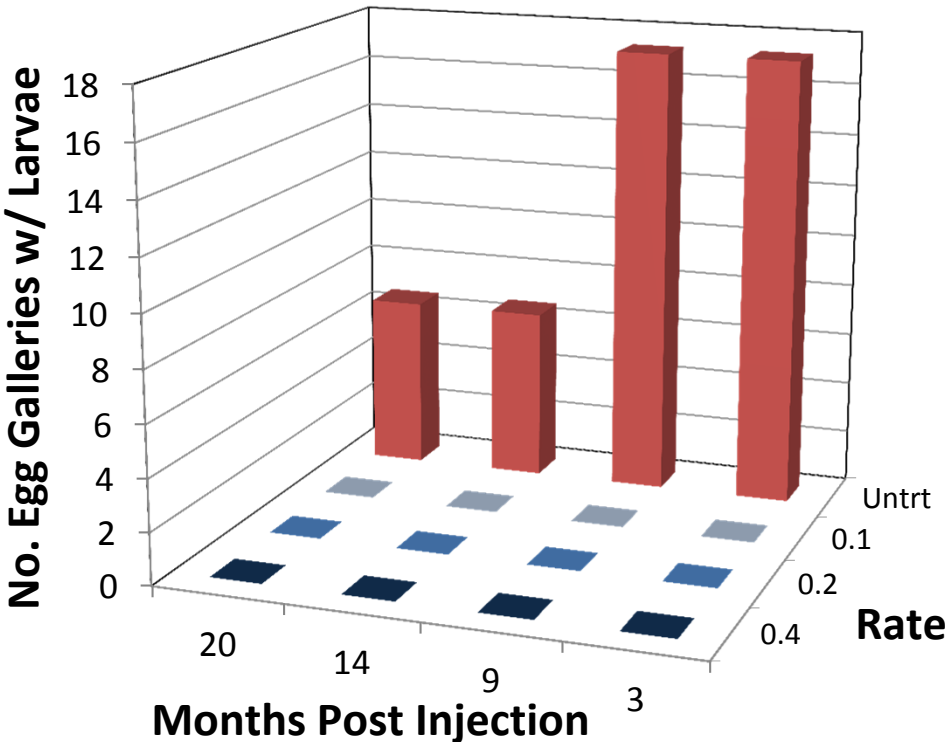
- **Continued trial to evaluate efficacy of abamectin at two rates against *Ips* in TX.**

- **Test efficacy of Azasol (azadirachtin) and Safari (dinoteferon) against Ips in TX.**

- **Continue evaluation of EB ± fungicide trials for:**

  1) SPB and blue stain fungi in Alabama.
  2) MPB and blue stain fungi in Utah.

Abacide 2® Control on Bark Beetle (*Ips*) on Felled Trees in Forested Sites

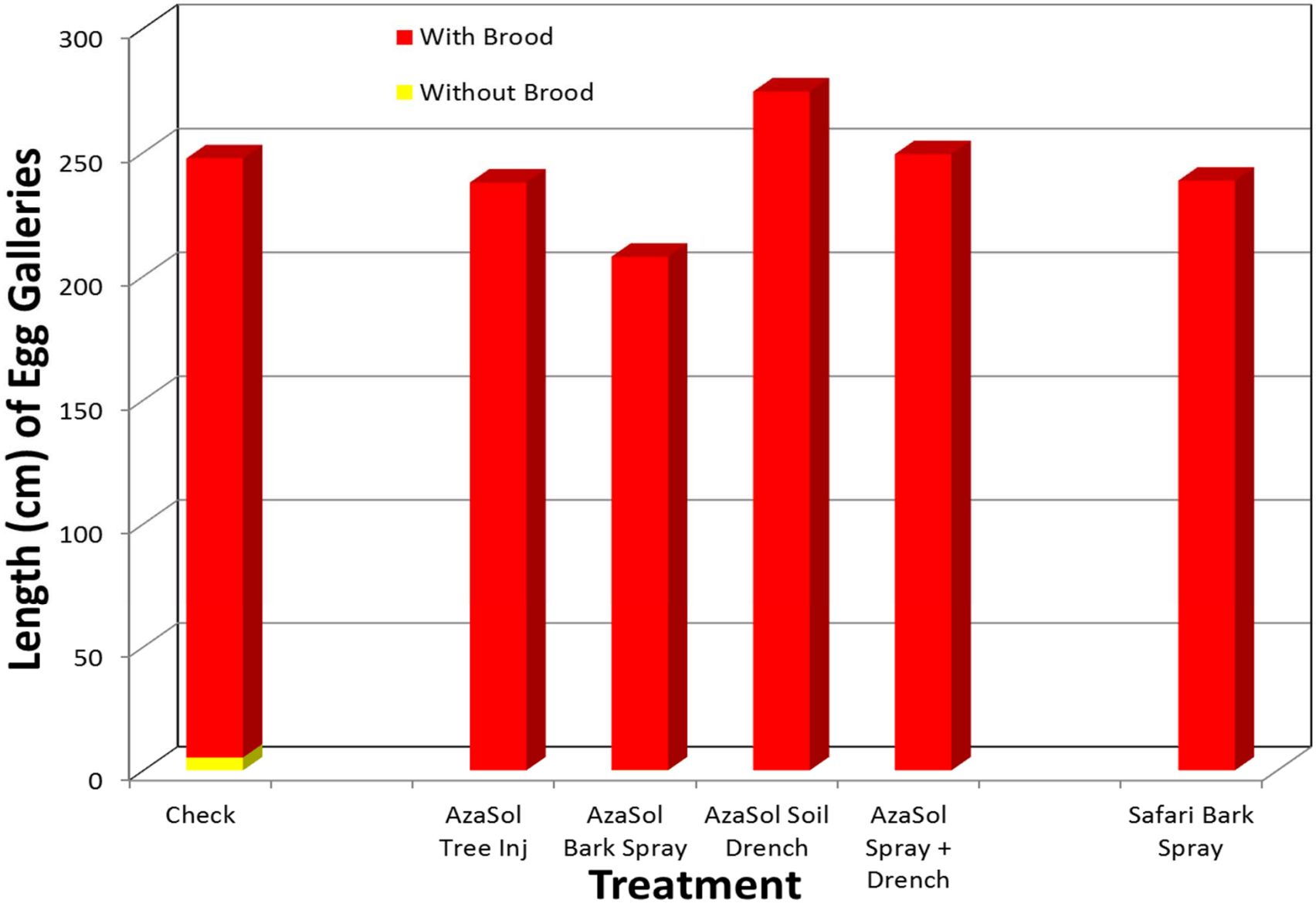


Abacide 2 Results

- Number of egg galleries with larvae was significantly reduced by Abacide 2 for nearly 2 years.
- All nuptial chambers were without egg galleries in 2nd year.

Abba Ultra (4%) difficult to inject but trial showed similar results.

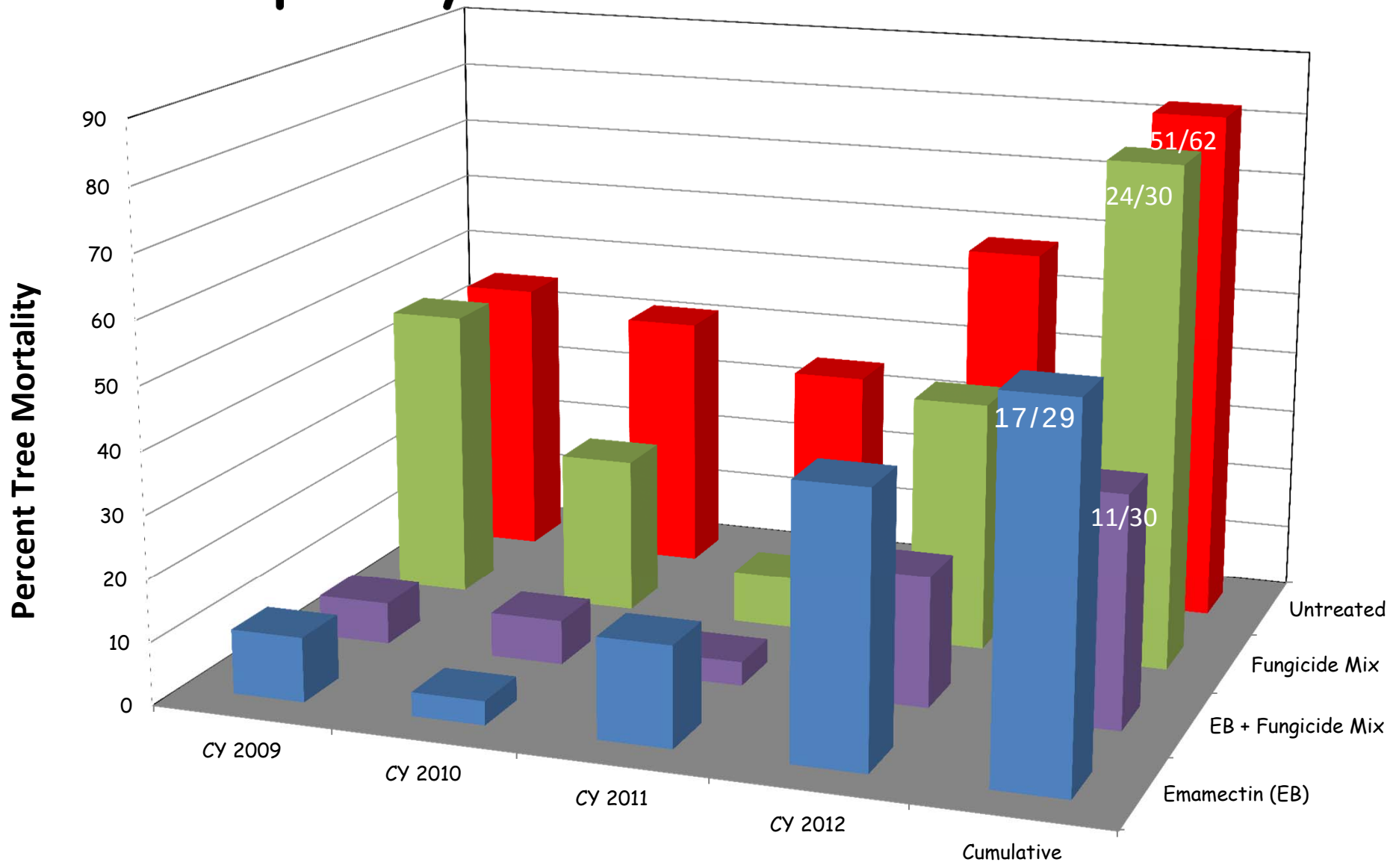
Effects of Azasol and Safari on *Ips* galleries length and brood development in loblolly pine logs 1 month after application.



SPB – Alabama 2009 - 2010

	Apr. 2009
• Emamectin benzoate (EB)	X
• Propiconazole + Thiabendazole + (PT)	X
• EB + PT	X
• Check	

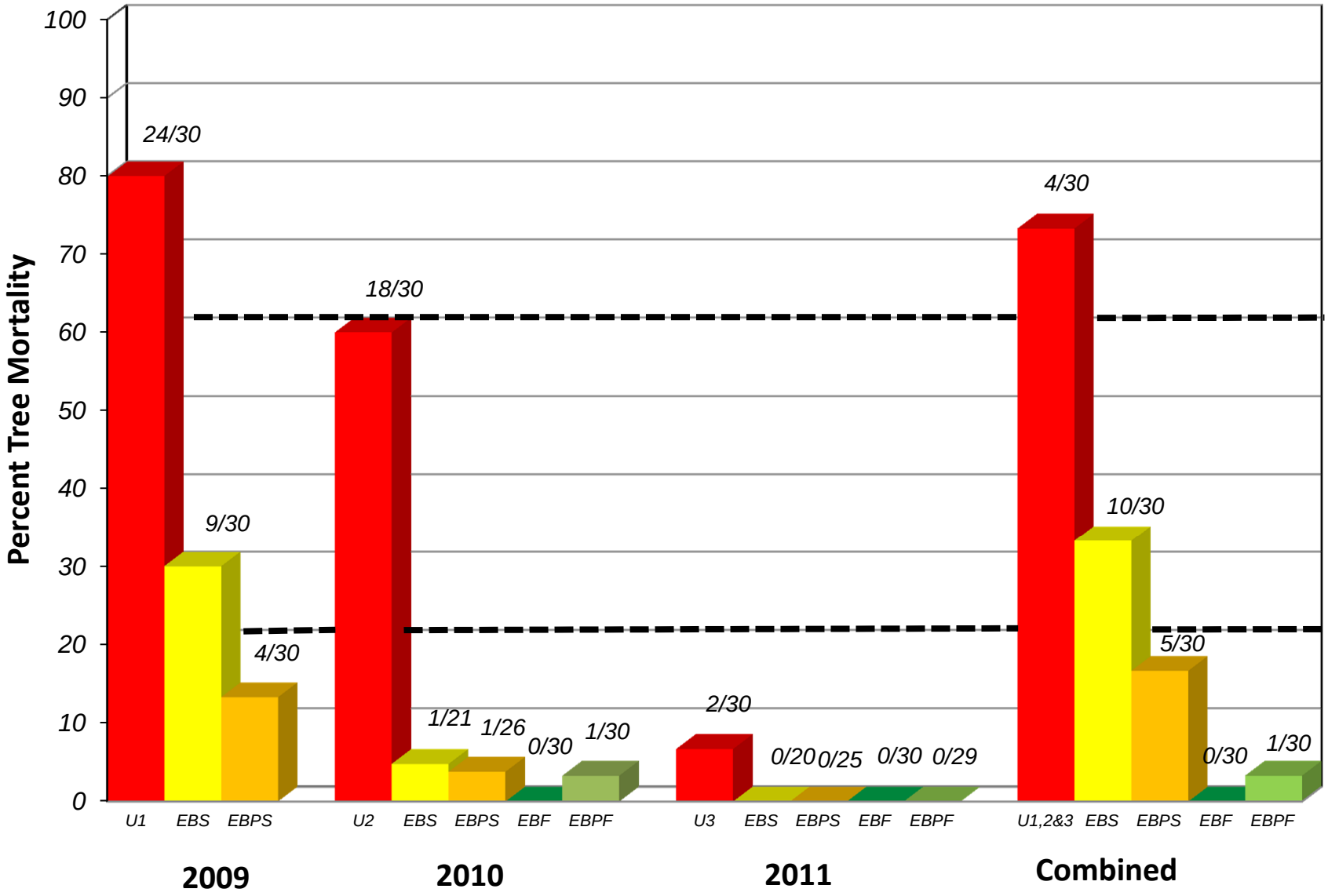
Effect of injection treatments on mortality of loblolly pine by SPB in AL: 2009 - 2012



MPB – Utah 2009

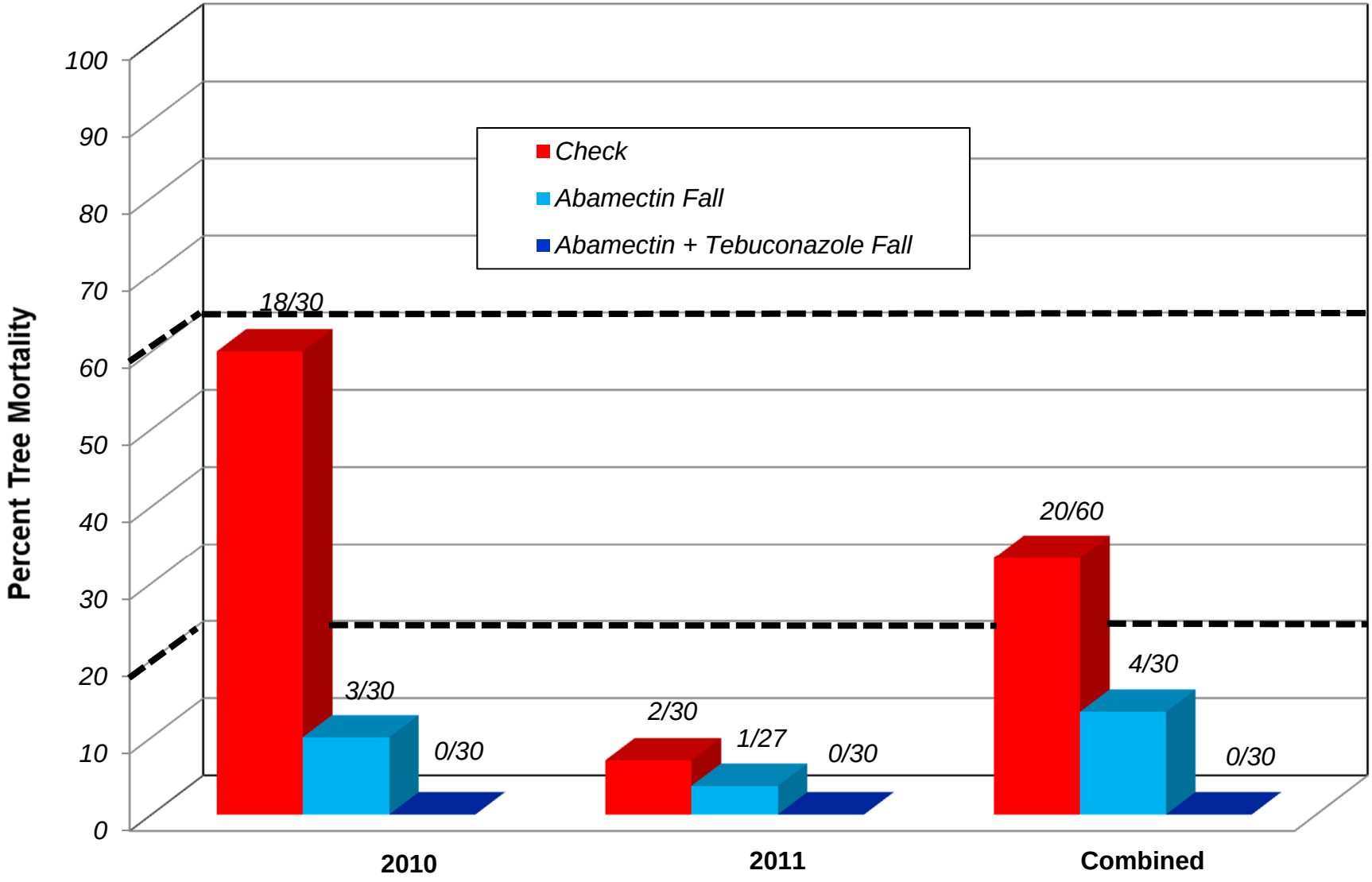
	Jun. '09	Sep. '09
• Emamectin benzoate (EB)	X	
• EB		X
• EB + Propiconazole (P)	X	
• EB + P	X	
• Abamectin (Aba)		X
• Aba + Tebuconazole (Teb)		X
• Check		

Efficacy of spring and fall (2009) injections of insecticide (EB) and insecticide + fungicide (EBP) for preventing MPB-caused mortality in lodgepole pine in Wasatch-Cache National Forest, UT: 2009 - 2011.



U = untreated, EB = emamectin benzoate, AB = abamectin, P = propiconazole, T = tebuconazole, S = spring, F = fa

Efficacy of fall (September 2009) injections of insecticide (ABF) and insecticide + fungicide (ABTF) for preventing MPB-caused mortality in lodgepole pine in Wasatch-Cache National Forest, UT: 2010 and 2011.



EB Trap Trees for SPB - 2012

- **Justification:** The southern pine beetle (SPB) populations are currently low, but can be expected to increase. A method for effectively dealing with SPB outbreaks in early stages of development is needed.

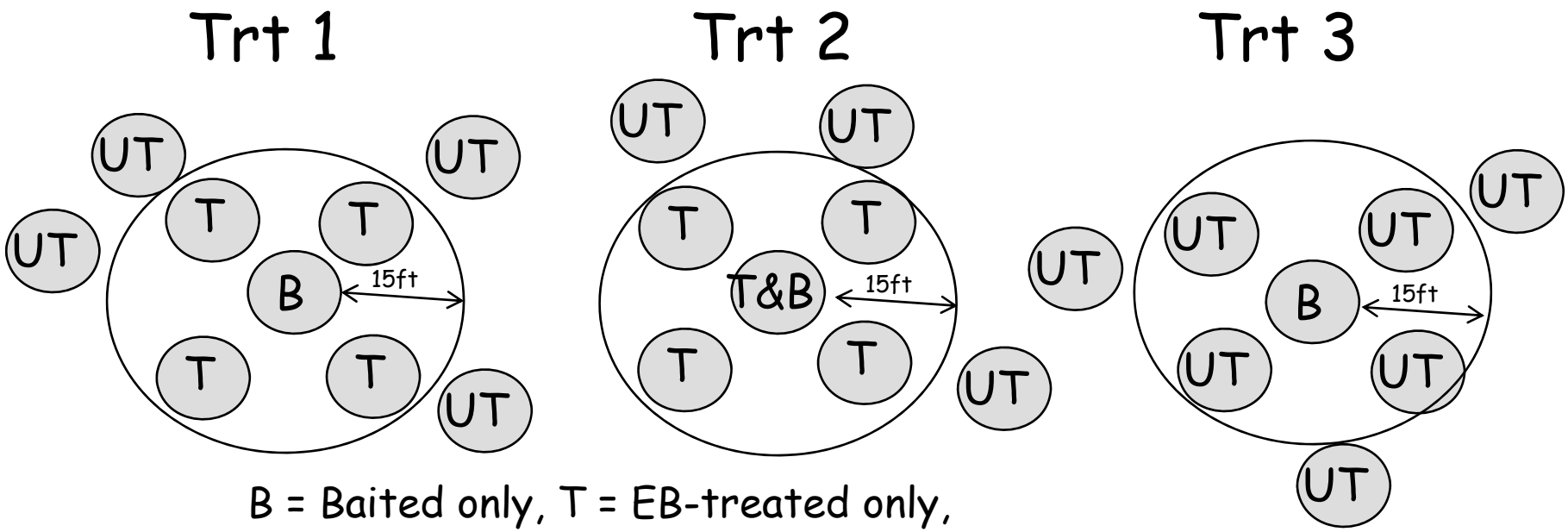
- **Objective:** Develop and evaluate a new management strategy to to maintain SPB populations below the Allee threshold required for re-establishment and spread, using current knowledge of SPB seasonal behavior, available methods of SPB monitoring, and new technology for suppression.

- **Treatments:**

  Baited, untreated trap tree surrounded by 3-8 unbaited, EB-treated trees (within 15 ft of baited trap tree),

  Baited, EB-treated trees surrounded by 3-8 unbaited, EB-treated trees (within 15 ft of baited trap tree),

  Baited trap tree only surrounded by 3-8 untreated trees (within 15 ft of baited trap tree).



B = Baited only, T = EB-treated only,
T&B = EB-treated and baited, UT = Untreated

Six replicates of each treatment installed in Talladega NF, Oakmulgee RD, AL and Prince Edward SF, VA.

Treated trees were allowed 4 weeks to circulate product before center trees were baited with frontalin, endo-brevicomin and alpha-pinene.

EB for BTB - 2012

- Justification: The black turpentine beetle (BTB) attack weakened and stressed pines. Common problem on trees used for production of navel stores.

- Objectives: 1) Determine if emamectin benzoate is active against BTB and 2) determine if height of injection influences treatment efficacy.

  Treatments:
- 1) TREE-age applied at 2.5 ml per inch DBH at ground level.
  2) TREE-age applied at 2.5 ml per inch DBH at 3 feet above the ground,
  3) TREE-age applied at 5.0 ml per inch DBH at ground level, and
  4) Untreated check.

  Trees will be allowed 4 weeks to circulate product before being baited with frontalin, endo-brevicomin and turpentine.

Black Walnut Trial - 2012

- **Justification:** Thousand cankers disease (TCD) was recently discovered in TN, VA and PA, within the native range of black walnut. Systemic insecticides and fungicides may be effective against the walnut twig beetle and TCD fungi, respectively.

- **Objective:** Evaluate the efficacy of emamectin benzoate (TREE-äge™) and the fungicide propiconazole alone or in combination for protecting individual walnut trees from attack by walnut twig beetle and other insect pests.

- **Treatments:**
  - Emamectin benzoate (EB).
  - Propiconazole (P).
  - EB + P Combo treatment

Status of Product Registration

- TREE-äge™ (emamectin benzoate) is registered in 49 of 50 states. It's a Restricted Use Product. Arborjet hope to remove RUP designation.

- Abamectin and fipronil have also shown very good efficacy against *Ips* engraver beetles. Mauget will likely add bark beetles and pine coneworm to their Abicide 2 label.

Injection System Evaluation

Chemjet

Pine Infuser

Portle

Macroinjection

Mauget

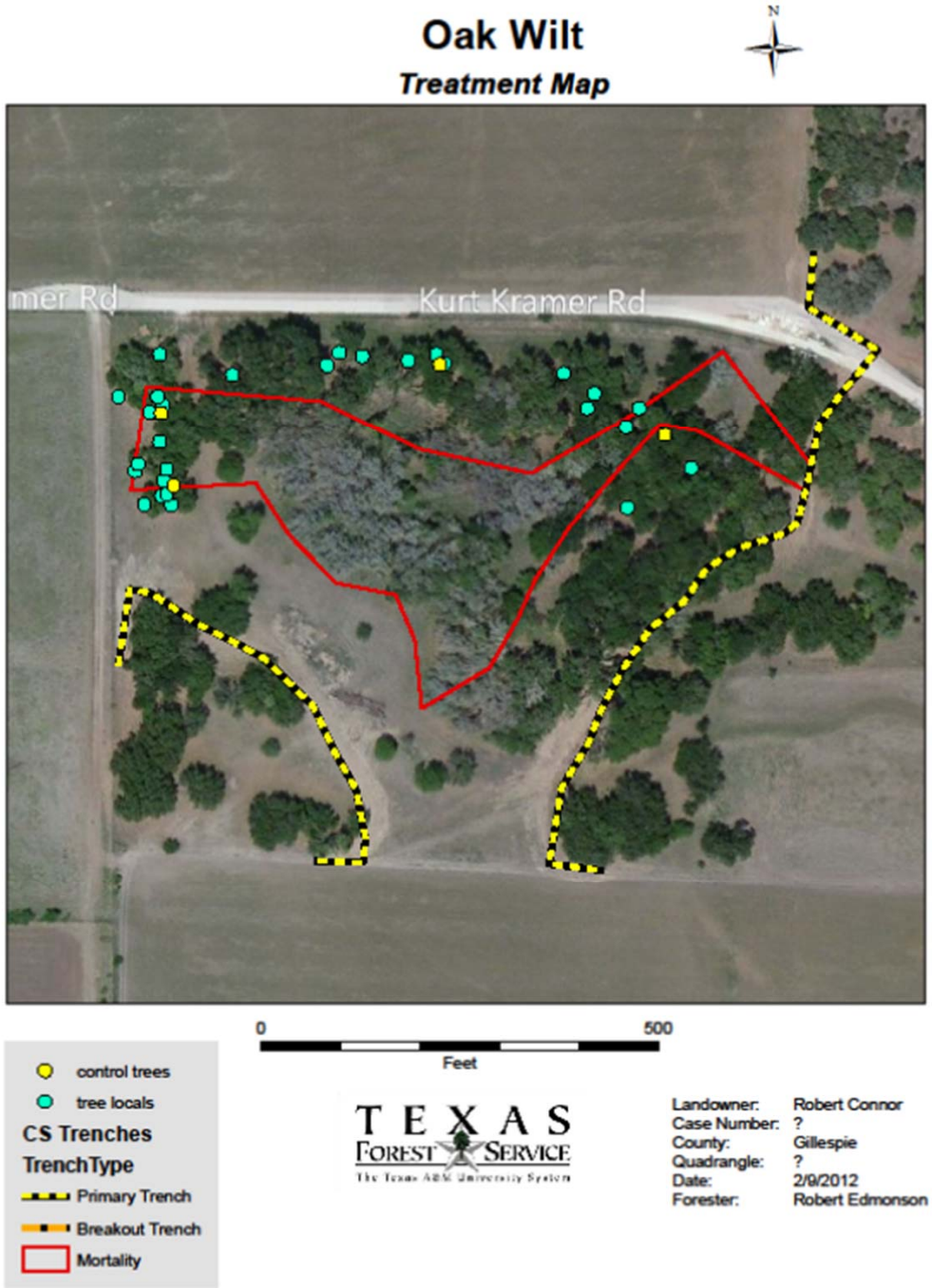
Tree IV

Comparison of characteristics of several injection systems that may be compatible with propiconazole (Alamo).

Characteristics (Potential Points)	System: Tree IV		Chemjet		Capsules		Pine Infuser		Portle		Macro-infusion	
Manufacturer	Arborjet		Chemjet Trading		Mauget		Rainbow TreeCare		ArborSystems		Rainbow TreeCare	
Retail Cost to treat 12 study trees = 150" (5)	Equipment ($900) + Plugs ($38) + Chemical ($168) = **$1106**	1	Equipment ($270) + Chemical ($168) = **$438**	5	$3.85 / unit = **$578**	4	Equipment ($656) + Chemical ($168) = **$824**	3	Equipment ($775) + Chemical ($168) = **$943**	2	Equipment ($652) + Chemical ($168) = **$820**	3
Can System be Left Alone on Tree? (2)	Yes	2	Yes	2	Yes	2	Yes	2	No	1	Yes	2
Chemical Prepackaged, Undilute, or Mixed (2)	mixed w/ water	1	mixed w/ water	1	prepackaged	2	mixed w/ water	1	prepackaged	2	mixed w/ high volume water	0
Weather restriction(s) (2)	cold and dry, but less so because of higher pressure	2	cold and dry	1	cold and dry	1	cold and dry	1	cold and dry, but less so because of higher pressure	2	cold and dry	1
Ease / time to fill system with chemical product (5)	3.2 min - need to fill system for each tree	2	2.6 min. - each unit filled separately prior to installation on each tree	3	prepackaged	5	4 min. - each unit needs to be filled separately as it is installed on tree	1	if prepackaged	5	2.7 min. - each unit filled separately prior to installation on each tree	3
No. of injection points required per tree (5)	5.7 points	5	12.6 points	4	12.9 points	4	7.9 points	5	23.5 points	2	31.4 points	1
Ease / time of system installation on tree (10)	install plugs at few pts, but more steps - 6.1 min / tree	7	generally easy, few steps - 6.2 min / tree	10	generally easy, few steps - 6.4 min / tree	10	generally easy, but several steps involved - 7.0 min / tree	6	generally easy, but several injection pts - 11.6 min / tree	6	labor intensive to expose roots and many injection points - 27.8 min / tree	1
Ease and time to inject X amount of product (20)	effectively applied to all trees - 53 min / tree	17	effectively applied almost always - 210 min / tree	8	effectively applied almost always - 255 min / tree	7	effectively applied to all trees - 42 min / tree, but have to monitor pressure	13	application time short (17.4 min / tree), but not easy to get all chemical into tree	10	effectively applied to all trees - 134 min / tree	11
Cumulative time spent at each tree (10)	present at tree only to install and remove - 9 min / tree	10	present at tree only to install and remove - 10 min / tree	10	present at tree only to install and remove - 9.5 min / tree	10	present at tree only to install and remove - 10 min / tree	10	moderate time and must remain at tree - 29 min / tree	1	considerable time for install and removal - 30 min / tree	1
System disposable or ease / time to clean system (4)	need to clean several units at end of day - 5.8 min	3	need to clean several units after each tree - 3 min / tree	2	disposable	4	need to clean several units after each tree - 3.8 min / tree	2	should be easy flush, but chemical was also on outer surface of injector and needles - 11 min	1	need to clean several units, tees and lines at end of day - 10 min	1
Potential for chemical exposure (5)	very little exposure potential	3	little potential for exposure	3	very little exposure potential	5	little potential for exposure	3	frequent leaks from and around needles	1	some potential exposure	2
Effectiveness of treatment as of Feb 9, 2012 (7.5 month after injection) (30)	excellent	30	very good	28	good	20	fair	15	fair	15	good	25
Total Score (out of 100 possible points)	**83**		**77**		**74**		**62**		**48**		**51**	

Excellent | Good | Fair | Poor | Bad

Scored 80% or higher



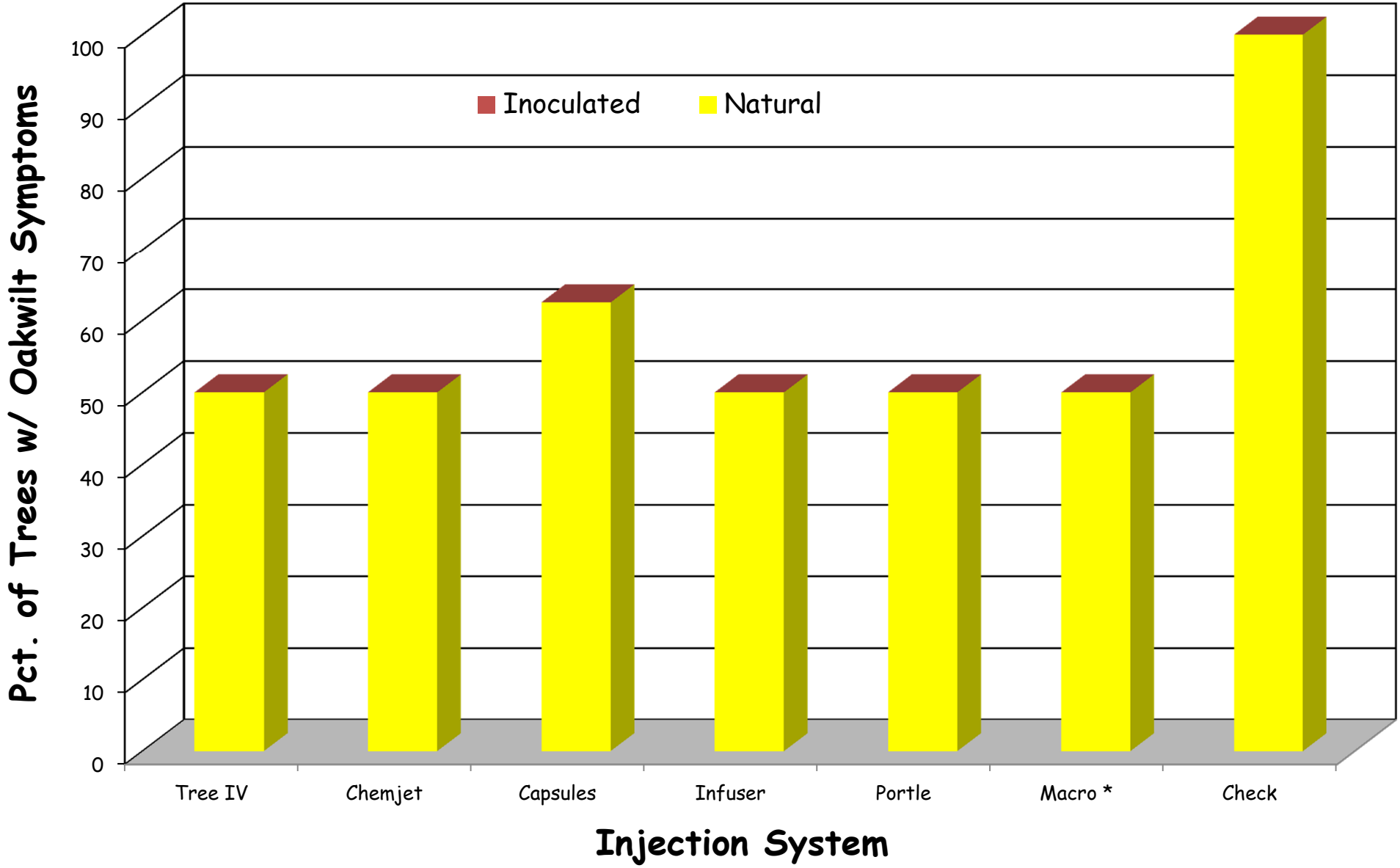
Four groups of 7 trees selected near each oak wilt center.

Trees treated with one of six injection systems at standard dose (10 ml/”) of Alamo.

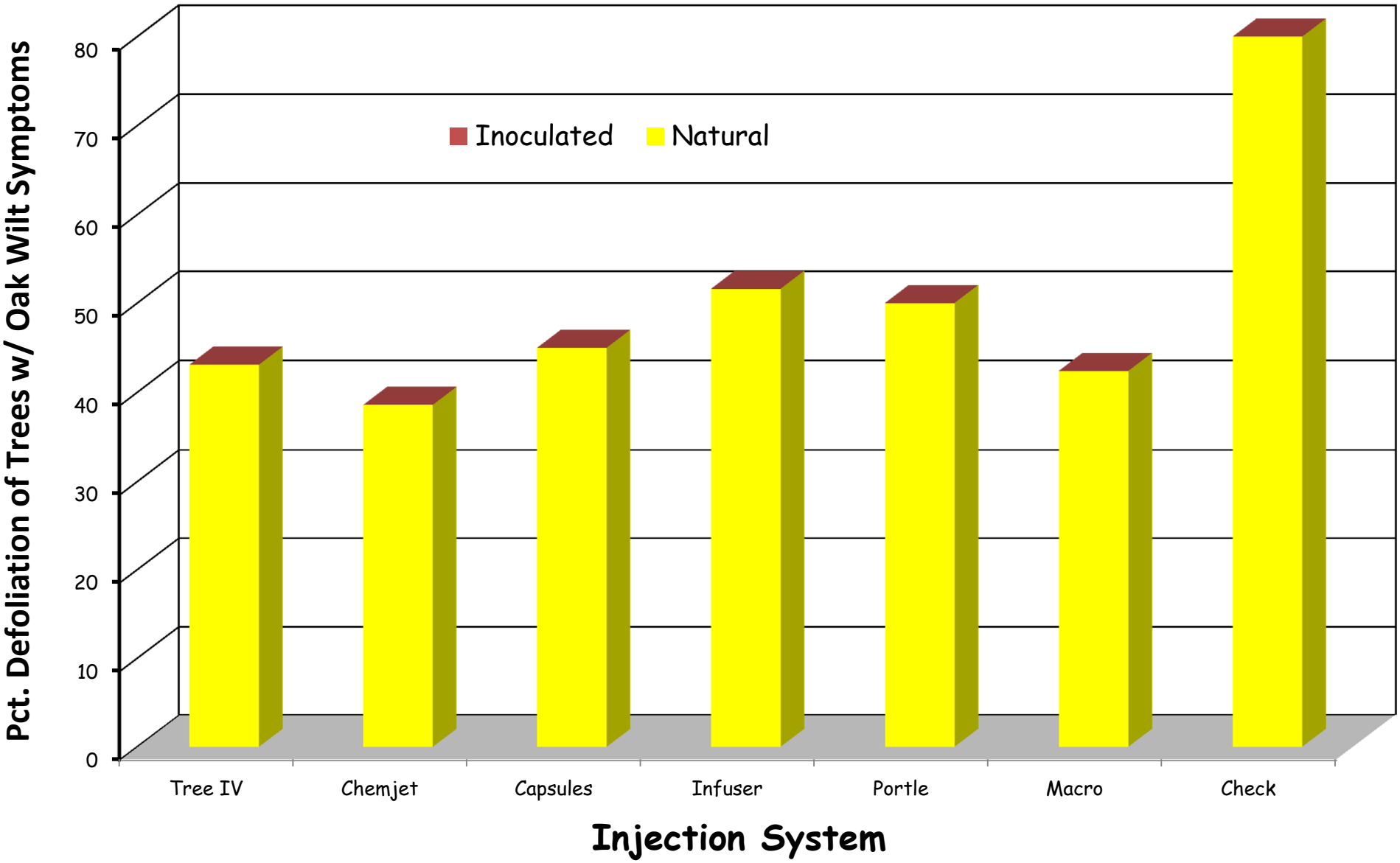
After five weeks, trees were inoculated with oak wilt fungal spore suspension.

Trees were monitored monthly for evidence of oak wilt disease development. Disease symptoms only manifested once rains returned in November.

Percent of live oaks on two Central Texas sites showing oak wilt symptoms (veinal necrosis) 16 months after treatment with Alamo (propiconazole), 2011-2012.



Percent defoliation of live oaks on two Central Texas sites showing oak wilt symptoms (veinal necrosis) 16 months after treatment with Alamo (propiconazole), 2011-2012.



Treatment for Hypoxylon Canker - 2012

- Justification: Hypoxylon canker killed thousands of oaks during the drought of 2011. No control option is available. A method for effectively treating trees in the early stages of infection is needed.

- Objective: Evaluate the potential of potassium salts of phosphorous acid (Phospho-jet™) for prevention or therapeutic treatment of oaks against hypoxylon canker.

- Treatments:
  - Twenty (20) red oaks each selected with three levels of hypoxylon canker infection: 1) healthy (<5% dieback), 2) light (5 - 20% dieback), and 3) moderate (20 – 80% dieback).
  - Ten trees in each group injected with Phospho-jet™ at 5 – 7 ml / inch DBH. Remaining trees left untreated.
  - Condition of all trees to be evaluated every 6 months.

Pine Wood Nematode Study - 2012

- **Justification:** Asian and European countries have banned the import of southern yellow pine from the US due to risk of pine wood nematode in logs. Can guidelines be developed that reduce/ eliminate risk of PWN export.

- **Objective:** Evaluate the occurrence and seasonality of pine wood nematode (PWN) in loblolly pine trees and logs.

- **Treatments:**
  - Presence of PWN in live, healthy trees.
  - Presence of PWN in adult wood borers (*Monochamus*).
  - Timing and seasonality of PWN in logs at different intervals (1-6 days) after tree felling, after movement to debarking site, and after debarking of logs.

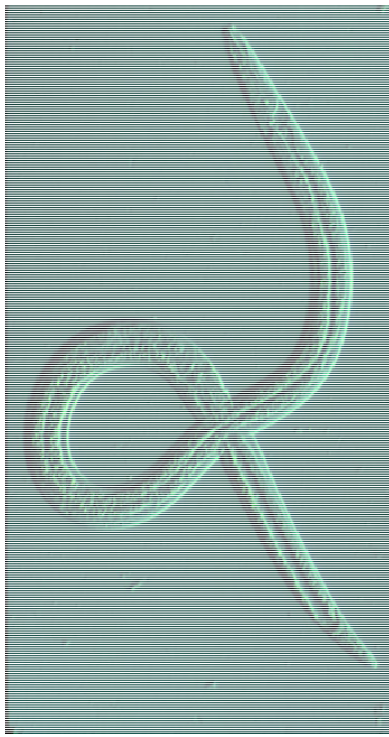
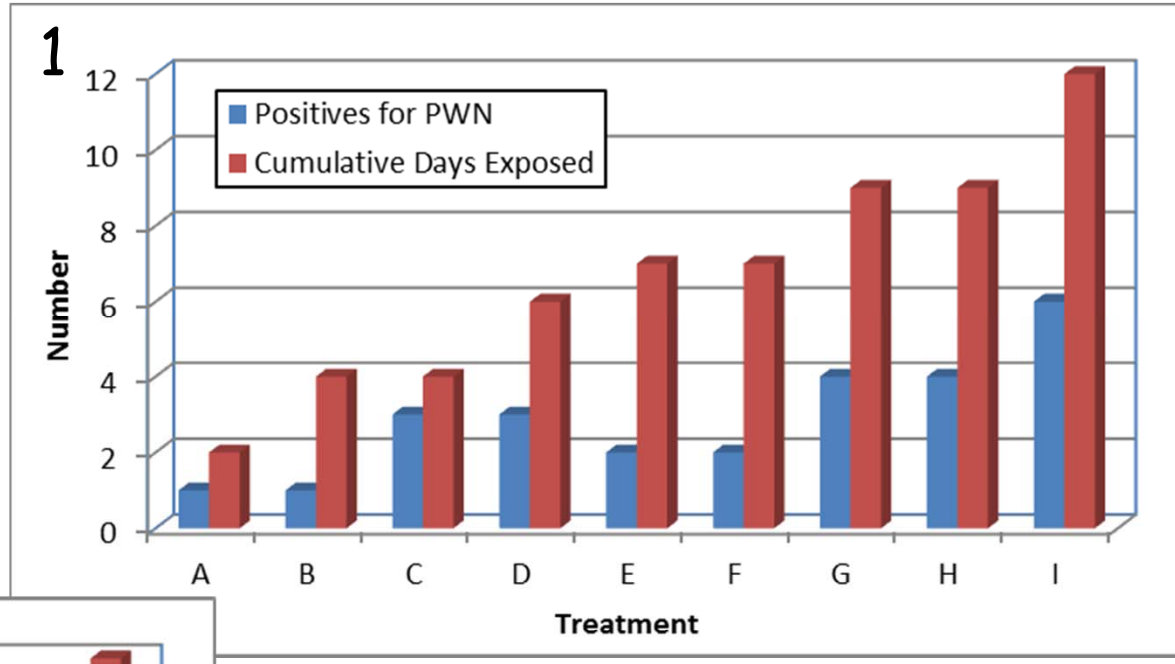
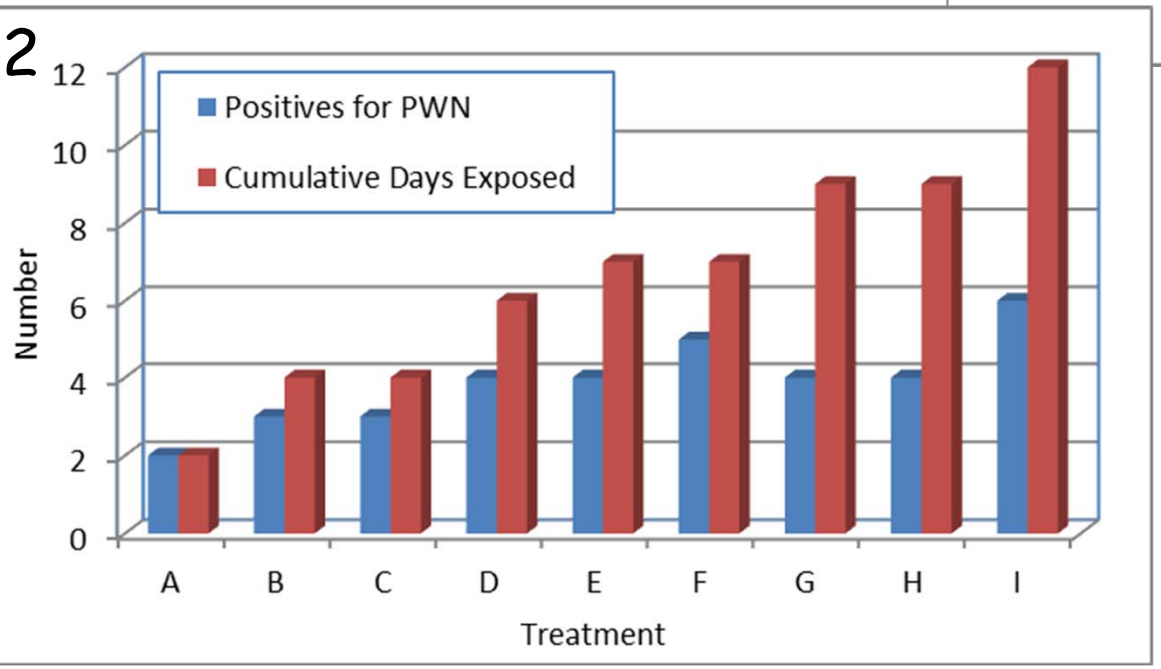


Table 1: Number of nematodes per sample collected from "live, healthy" loblolly pine; just after felling.

Tree	Level	Site 1	Site 2	Site 3	Site 4
1	Upper Crown	0	0	0	0
	Lower Crown	0	0	0	0
	Lower Bole	0	0	0	0
2	Upper Crown	0	0	0	0
	Lower Crown	0	0	0	0
	Lower Bole	0	0	0	0
3	Upper Crown	0	0	0	0
	Lower Crown	0	0	0	0
	Lower Bole	0	0	0	0
4	Upper Crown	0	0	0	0
	Lower Crown	0	0	0	0
	Lower Bole	0	0	0	0
5	Upper Crown	0	0	0	0
	Lower Crown	0	0	0	0
	Lower Bole	0	0	0	0
6	Upper Crown	0	0	0	0
	Lower Crown	0	0	0	0
	Lower Bole	0	0	0	0
Date collected		7-May	21-May	16-Jul	30-Jul

Occurrence of pinewood nematode in loblolly pine logs after different intervals of exposure to cerambycids and engraver beetles on sites 1 and 2 during the spring 2012, East Texas.





EB for PWN - 2013

- Justification: Due to the risk of pinewood nematode (PWN) occurring in pine logs, export of logs is severely restricted. Can risk be eliminated by trunk injection of emamectin benzoate (EB) prior to tree harvest?

- Objectives: 1) Determine if EB is active against PWN at different rates and injection spacings, and 2) determine the duration of EB treatments.

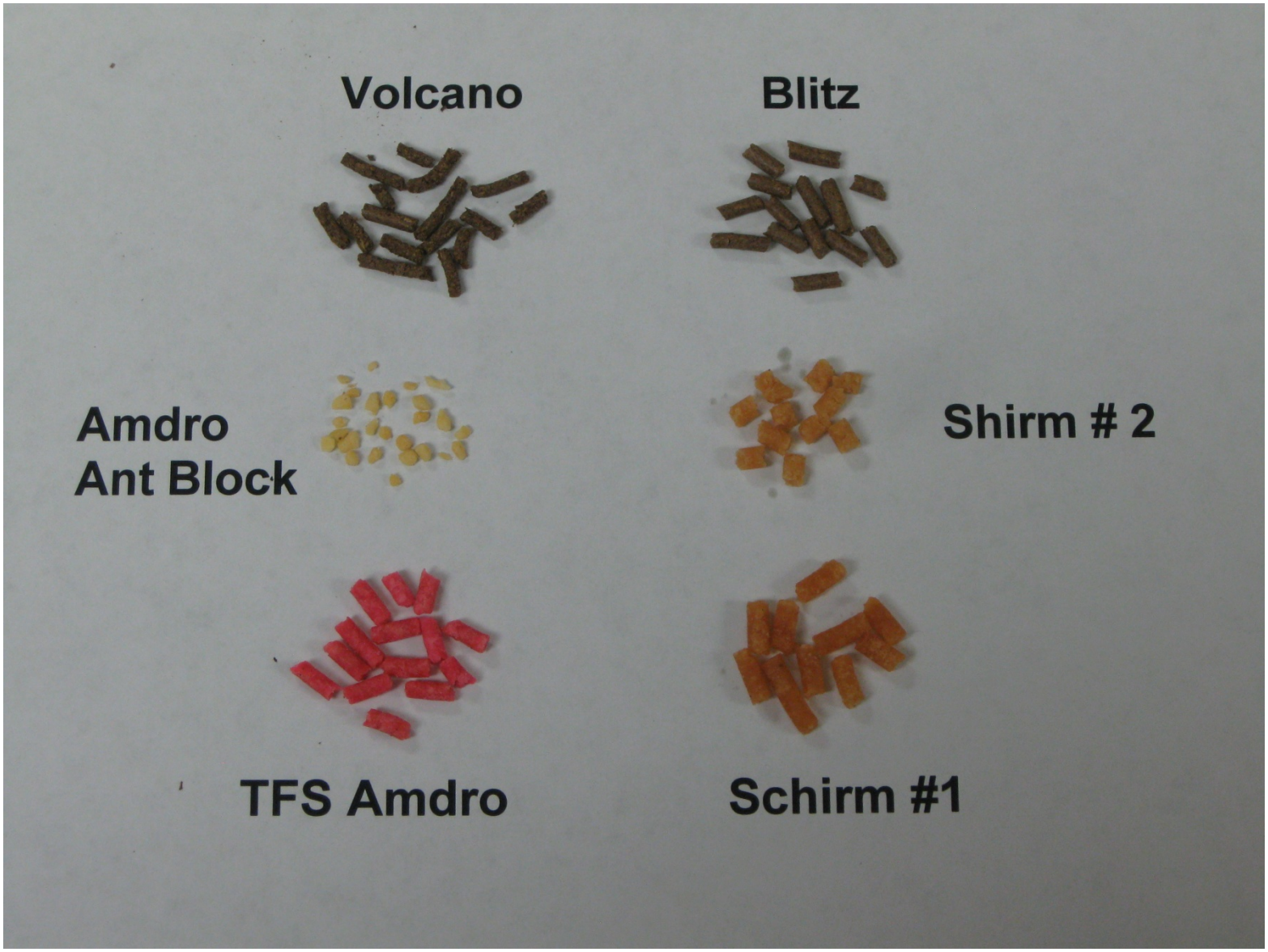
- Trial 1 (Dec '12):
  EB @ 0.75 ml/inch @ 4" spacing
  EB @ 0.75 ml/inch @ 8" spacing
  EB @ 0.75 ml/inch @ 16" spacing
  EB @ 1.25 ml/inch @ 4" spacing
  EB @ 1.25 ml/inch @ 8" spacing
  EB @ 1.25 ml/inch @ 16" spacing
  EB @ 2.5 ml/inch @ 4" spacing
  EB @ 2.5 ml/inch @ 8" spacing
  EB @ 5.0 ml/inch @ 4" spacing
  Check (untreated)

- Trial 2 (April '13):
  EB (best trial 1) felled **2** wk post injection
  EB (best trial 1) felled **1** mo post injection
  EB (best trial 1) felled **2** mo post injection
  EB (best trial 1) felled **3** mo post injection
  EB (best trial 1) felled **12** mo post injection
  EB (best trial 1) felled **24** mo post injection
  EB (best trial 1) felled **36** mo post injection
  EB (best trial 1) felled **48** mo post injection
  Check (untreated)

Trees will be allowed 4 months (Trial 1) or 1-48 months (Trial 2) to circulate product before logs are exposed to *Monochamus* beetle/PWN.

Leaf-cutting Ant Control

Different Leaf-cutting Ant Baits



PTM™ (fipronil) solution applied to entrance holes within the Central Nest Area at 40 ml per hole.

Status of LCA Control Options

- Volcano registered in 1999, but phased out in 2003.
- EPA approved the addition of Texas leaf-cutting ants to the PTM™ Insecticide label in December 2009. PTM was available in 2.5 gal and 20 oz containers. BASF willcontinue producing 20 oz.
- Efficacy of LCA bait is ~33% better than Ant Block in 2009 & 2010 trials. Central Garden and Pet has yet to submit for registration.
- Forest Stewardship Council (FSC) regulations expected to prohibit use of fipronil-, sulfluramid-, and hydramethylnon-containing baits in South American forest plantations by 2015.

LCA Research Efforts in 2012

- Syngenta is interested in development and efficacy testing of new bait formulations for control of leafcutter ants.
- Primary interest is for South American markets, but may consider registration in US.
- Prototype bait was not attractive to TLCA in preference test. Syngenta is alternative carrier.

Status of IFA Control Option

- The efficacy of PTM averaged >90% for the three trials. BASF is willing to support the expansion of the label.
- BASF submitted a request to EPA in June 2010 for approval of the addition of red imported fire ants to the PTM™ Insecticide label. However, EPA is in the process of reregistering fipronil. EPA approval is expected this year.

Deer Repellent Trial - 2012

- Justification: Deer cause significant damage to hardwood seedling in nurseries and after planting. Repellex USA has recently registered systemic tablet containing a natural hot pepper chemical, capsicum.
- Objective: Evaluate the ability of the Repellex systemic tablet to reduce/eliminate deer feeding damage on hardwood seedlings.
- Treatments:
  - Repellex tablets (2) applied at planting
  - Repellex tablets (2) applied post plant next to seedling
  - Deer Away BGR spray applied after planting
  - Untreated Check

Continuation of Syngenta and FPMC Projects

Very good cooperative relationship with Dave Cox (Syngenta) and Joe Doccola (Arborjet).

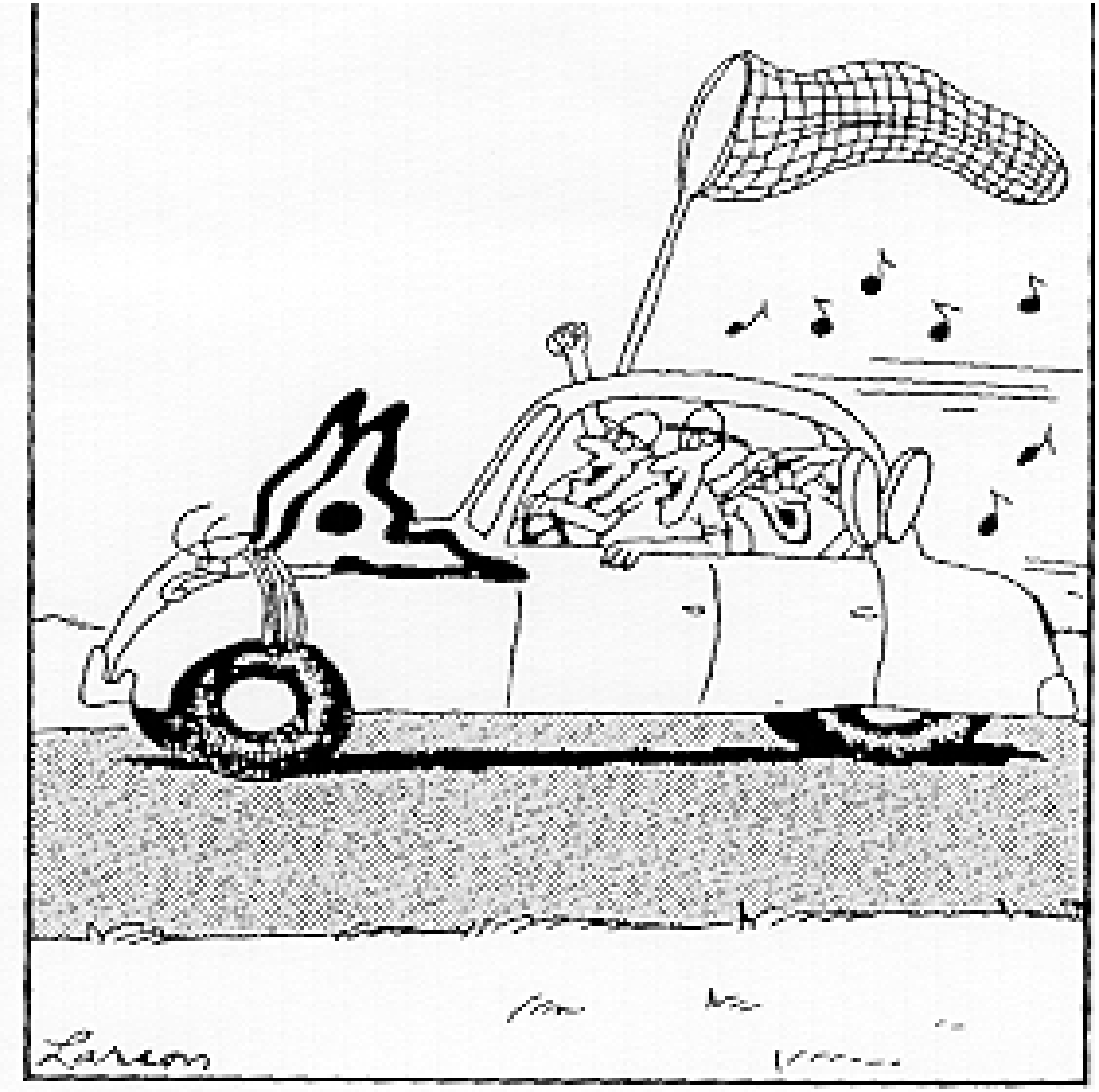
Current and Future Trials

- SPB Allee (trap tree)
- WTB/TCD (tissue analysis)
- Black turpentine beetle
- Tip Moth (plug injection)
- Leaf-cutting ant (bait development, SA market)

- Conifer Mites
- Pinewood nematode (log export)
- Spruce beetle (reevaluation)
- Oak wilt
- Hypoxylon canker

Other Issues

- Forestry Pesticide web page
- New pest problems of concern?
- New FPMC Coordinator
- Anything else?



Thank you again for your support!!