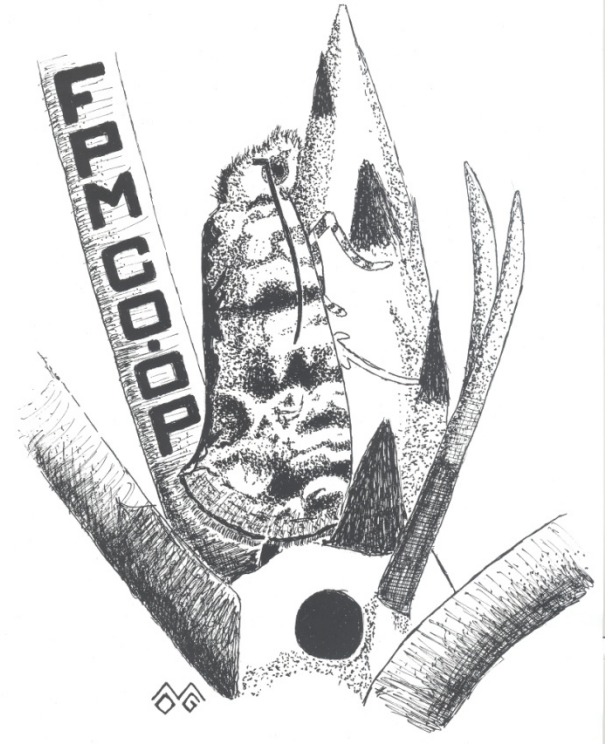
FOREST PEST MANAGEMENT COOPERATIVE

2012 Executive Committee Meeting



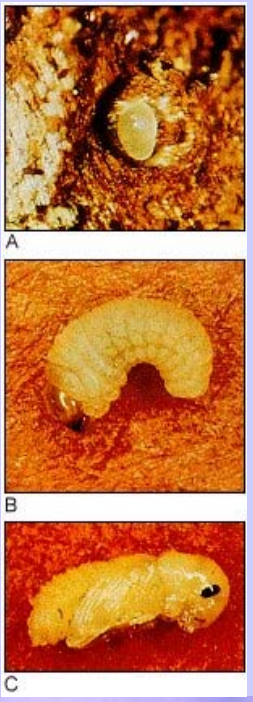
May 30-31, 2012
International Forestry Company
Moultrie, GA

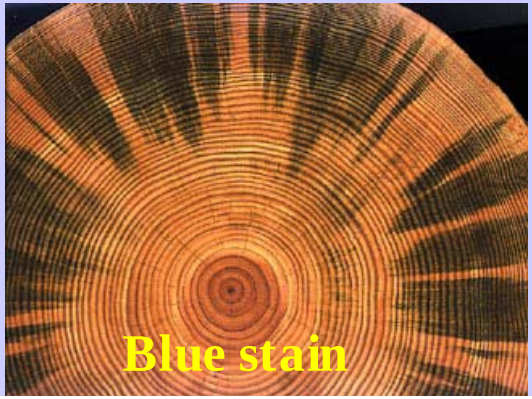
Agenda

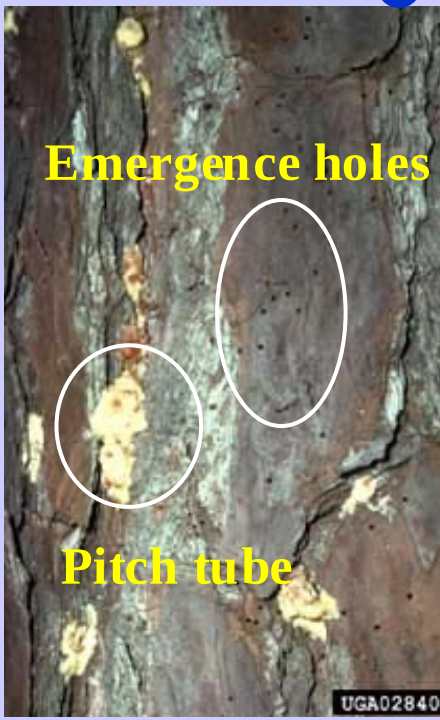
- Introductions.
- Pest Activity in 2011
- Overview of recent FPMC accomplishments
- Discussion of 2011 research proposals
- Containerized Seedling Plug Injection System
- FPMC & Forestry Pesticide Web Sites
- Training needs (?)
- Other items (?)

Southern Pine Beetle
Dendroctonus frontalis

SPB life stages







Southern pine beetle infestations by state, 2001 - 2011 and latest trend.

State	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	Latest Trend
OK	0	0	0	0	0	0	0	0	0	0	0	Stable
AR	0	0	0	0	0	0	0	0	0	0	0	Stable
TX	0	0	0	0	0	0	0	0	0	0	0	Stable
LA	0	0	0	0	0	0	5	1	1	0	0	Stable
MS	143	689	65	158	92	50	208	31	0	10	2	Down
AL	11,849	4,991	206	1,434	1,791	1,286	765	222	9	22	28	Stable
GA	4,938	9,070	333	73	0	0	2,077	115	24	4	0	Down
TN	12,746	6,394	1,294	257	5	14	39	1	0	0	0	Stable
KY	3,456	NA	NA	0	0	0	0	0	1	0	0	Stable
VA	763	274	50	10	0	0	64	33	25	25	31	Stable
FL	2,892	650	2	10	7	3	43	22	15	1	1	Stable
SC	22,270	67,127	9,514	4,324	2,388	2,267	734	990	142	0	0	Stable
NC	3,871	4,028	181	10	24	49	15	131	5	5	0	Down
Total	62,928	93,223	11,645	6,276	4,307	3,669	3,950	1,546	222	67	62	Down

Extensive pine mortality occurred across the South (particularly in Texas, Arkansas, and Louisiana) in 2011.

Mortality was attributed to *Ips* engraver beetles, but stress factor was likely drought.

Total rainfall (inches) at locations across the South compared to annual average: 2003 - 2011. (Black is surplus and red is a deficit)

Location	2003	2004	2005	2006	2007	2008	2009	2010	2011	Average	11 to Avg Difference
Lufkin, TX	44.98	78.14	27.26	41.08	50.49	40.63	55.19	30.01	33.77	46.62	-12.85
Monticello, AR	36.52	66.77	26.96	---	37.61	51.58	68.21	32.27	35.24	55.33	-20.09
Alexandria, LA	44.92	59.33	33.45	53.62	47.92	57.02	55.53	37.31	35.12	61.44	-26.32
Jackson, MS	55.48	46.45	31.45	41.92	32.63	54.55	58.79	37.84	31.42	58.64	-27.22
Birmingham, AL	61.30	55.62	49.17	56.55	28.86	55.64	71.66	47.89	58.32	52.16	6.16
Macon, GA	56.74	47.95	48.53	34.45	39.85	48.14	61.63	44.13	33.14	45.00	-11.86
Richmond, VA	60.23	55.49	37.56	53.29	37.90	48.90	48.32	35.86	47.72	44.10	3.62
Raleigh, NC	49.08	45.87	37.56	53.69	35.81	50.22	40.43	36.94	43.70	46.55	-2.85
Columbia, SC	52.99	39.71	39.44	38.95	30.19	46.38	49.15	35.92	43.84	50.14	-6.30
Tallahassee, FL	63.59	56.24	68.21	49.34	44.52	60.28	57.91	58.67	34.69	63.21	-28.52

Source: Weather Underground (www.wunderground.com).

Tip Moth Outbreak in the Western Gulf Region

Extensive tip moth damage to 4 year-old loblolly pine in AR.

Multiple tip moth attacks on loblolly pine shoot in LA.

Shoot mortality (12”) on 3 year-old loblolly pine in TX.

FPMC Research Projects - 2011

Ants

Leaf-cutting ant

Systemic Pesticide Injection

Seed Orchard; *Ips; Dendroctonus;* Oak; Invasives

Tip Moth

Impact; Hazard Rating; Control

Leaf-cutting Ant Control

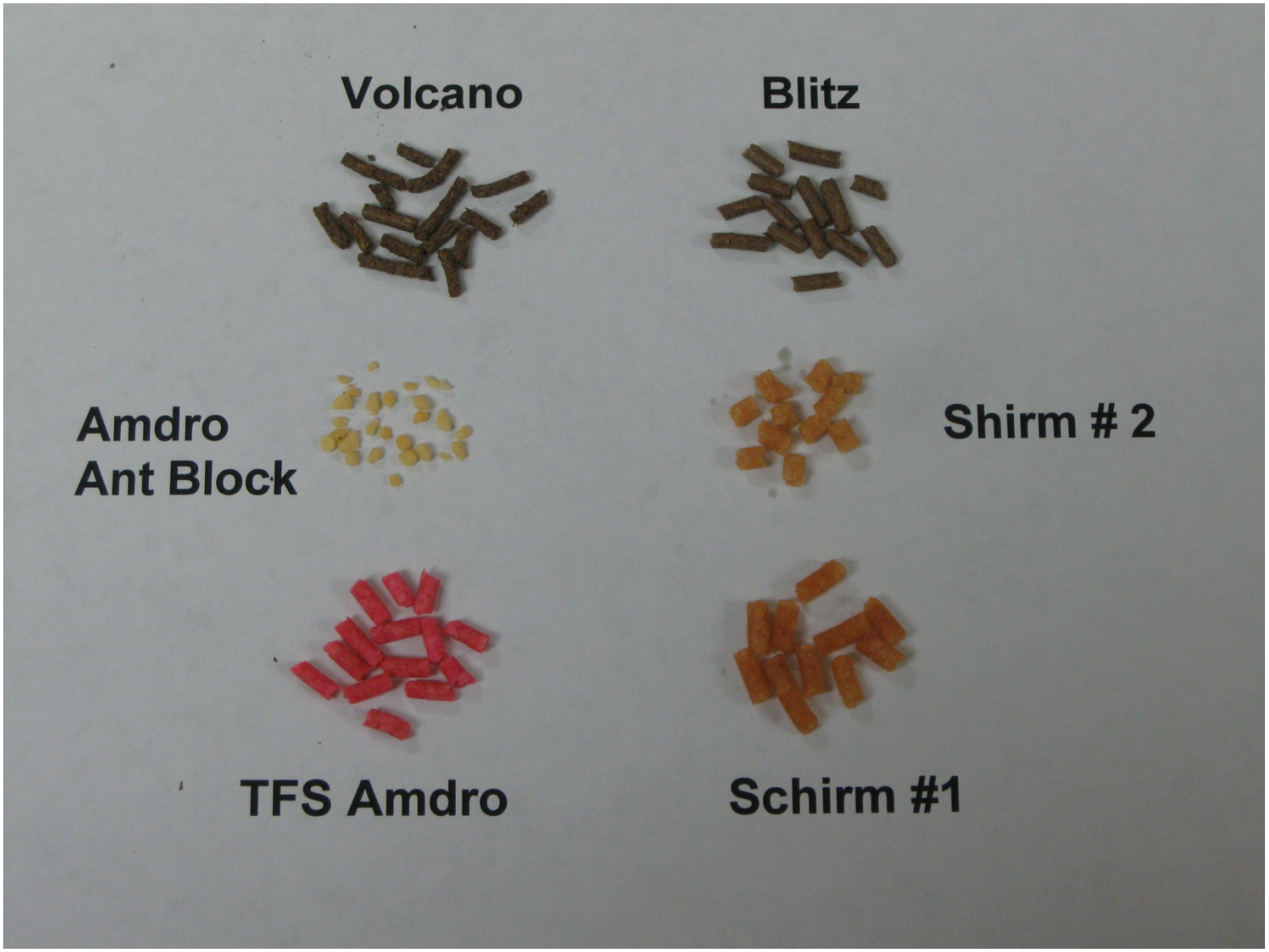
Leaf-Cutting Ant: 1996 - 2011

Objective

- **Evaluate and register one or more alternatives to methyl bromide and Amdro® Ant Block for control of the Texas leaf-cutting ant.**

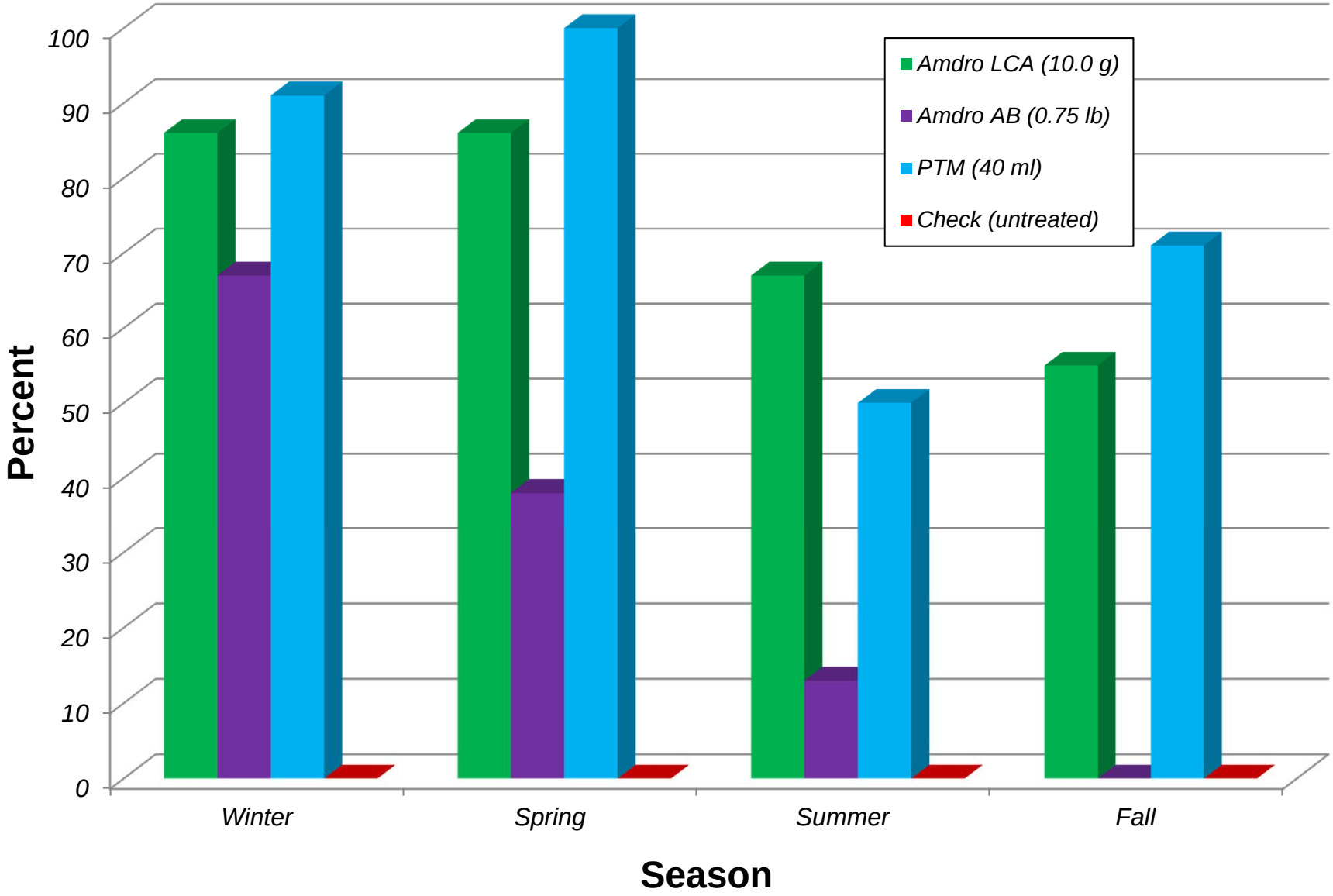
In 2011, waiting for registration of new modified (larger) Amdro LCA bait.

Different Leaf-cutting Ant Baits



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

Efficacy of modified (LCA) and unmodified (AB) Amdro® and PTM™ Soil Injection for halting Texas leaf-cutting ant activity 16 weeks after colony treatment, East Texas, 2009.



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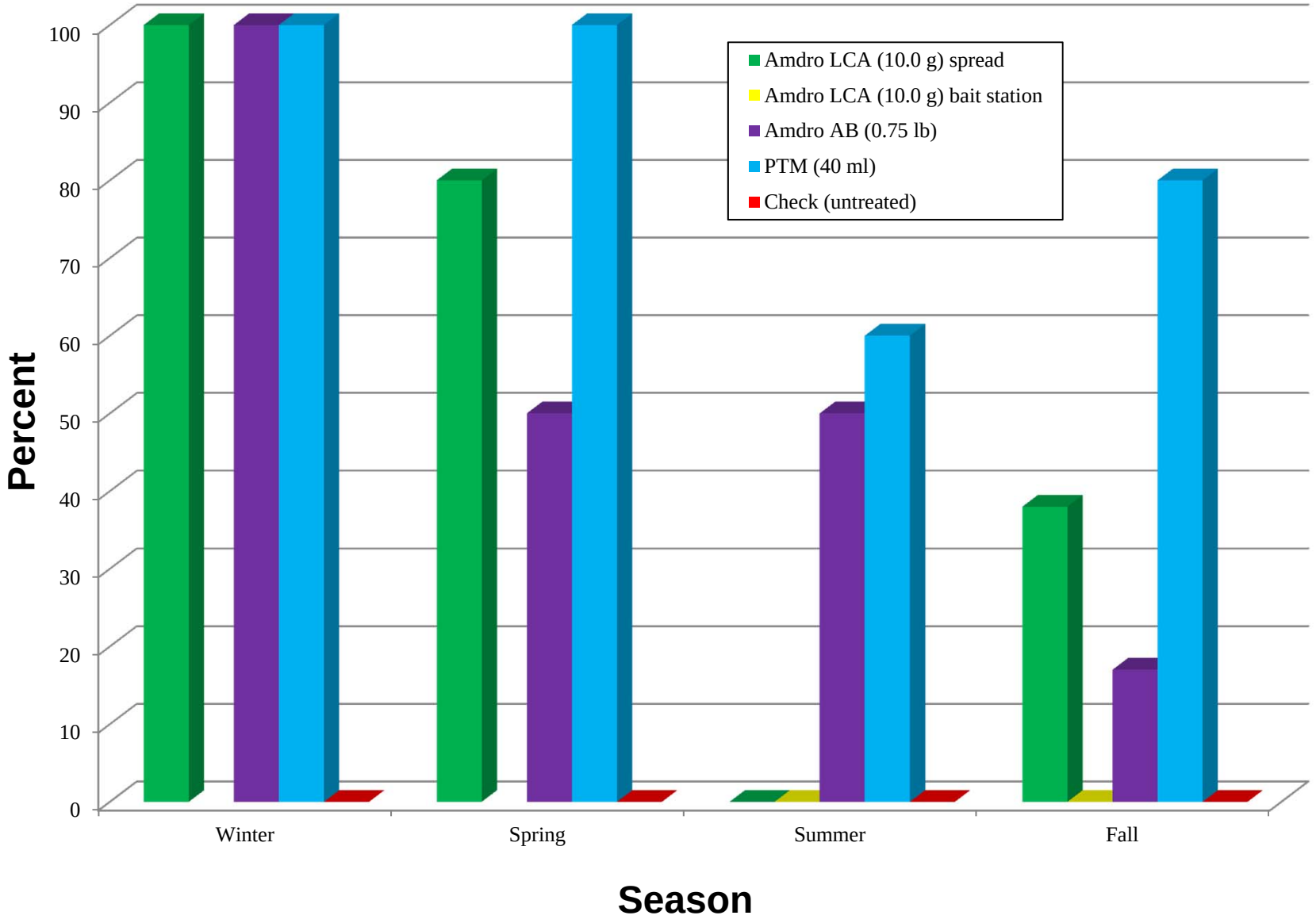


Status of LCA Control Options

- **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 may discontinue 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.**

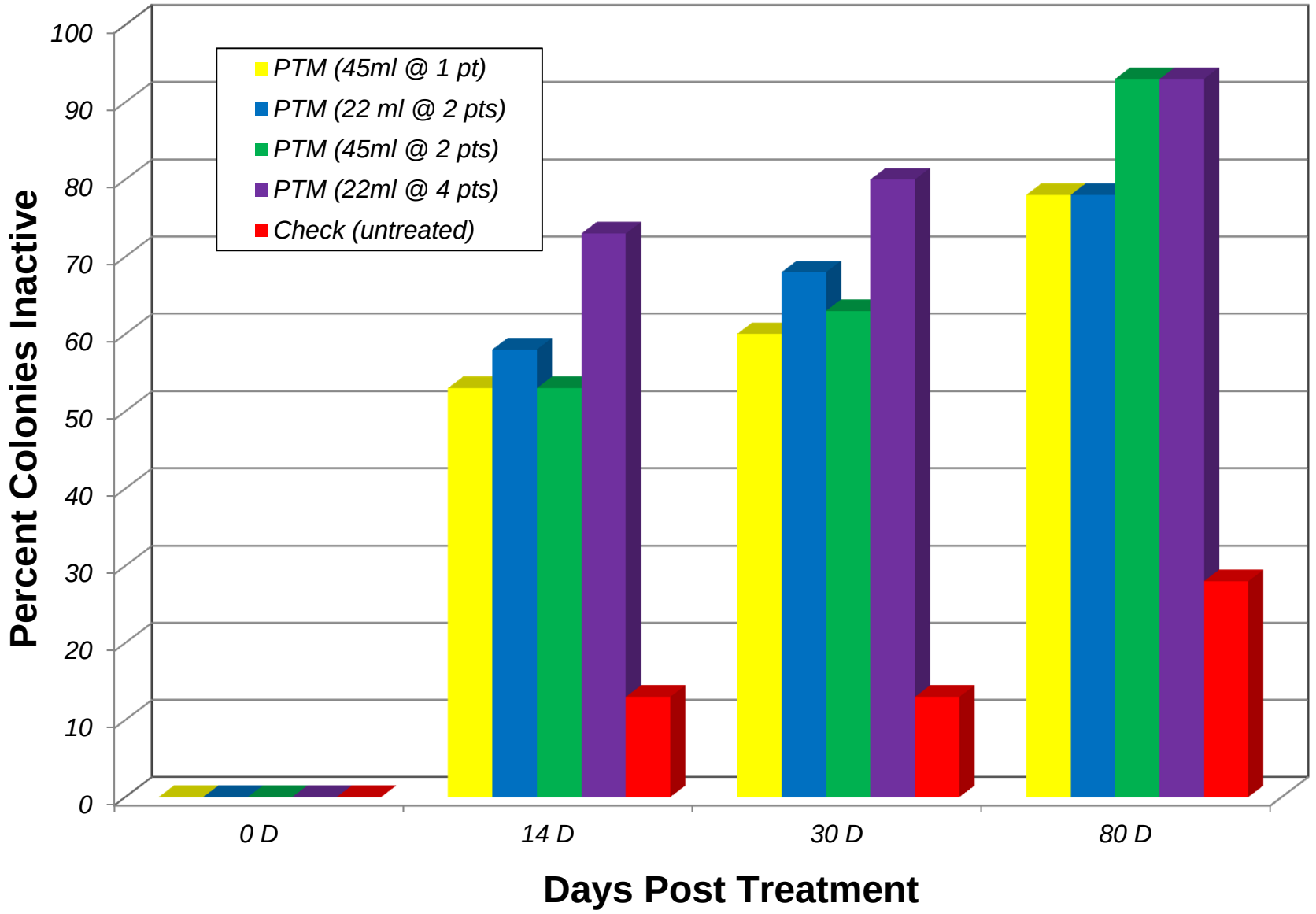
- **Forest Stewardship Council (FSC) regulations expected to prohibit use of fipronil-, sulfluramid-, and hydramethylnon-containing baits in South American forest plantations by 2015.**

Imported Fire Ant: 2009 & 2010

Objectives

- **Expand market for PTM™**
- **Evaluate and register PTM™ for control of the Imported fire ant.**

Efficacy of PTM™ Soil Injection for halting imported fire ant activity 11 weeks after colony treatment, East Texas, Spring 2010.



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.**

Proposed 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.
- Currently reviewing confidentiality agreement; if all goes as planned, bait development should begin in July.

Systemic Tree Injection

Research Efforts in 2010

Seed Orchard

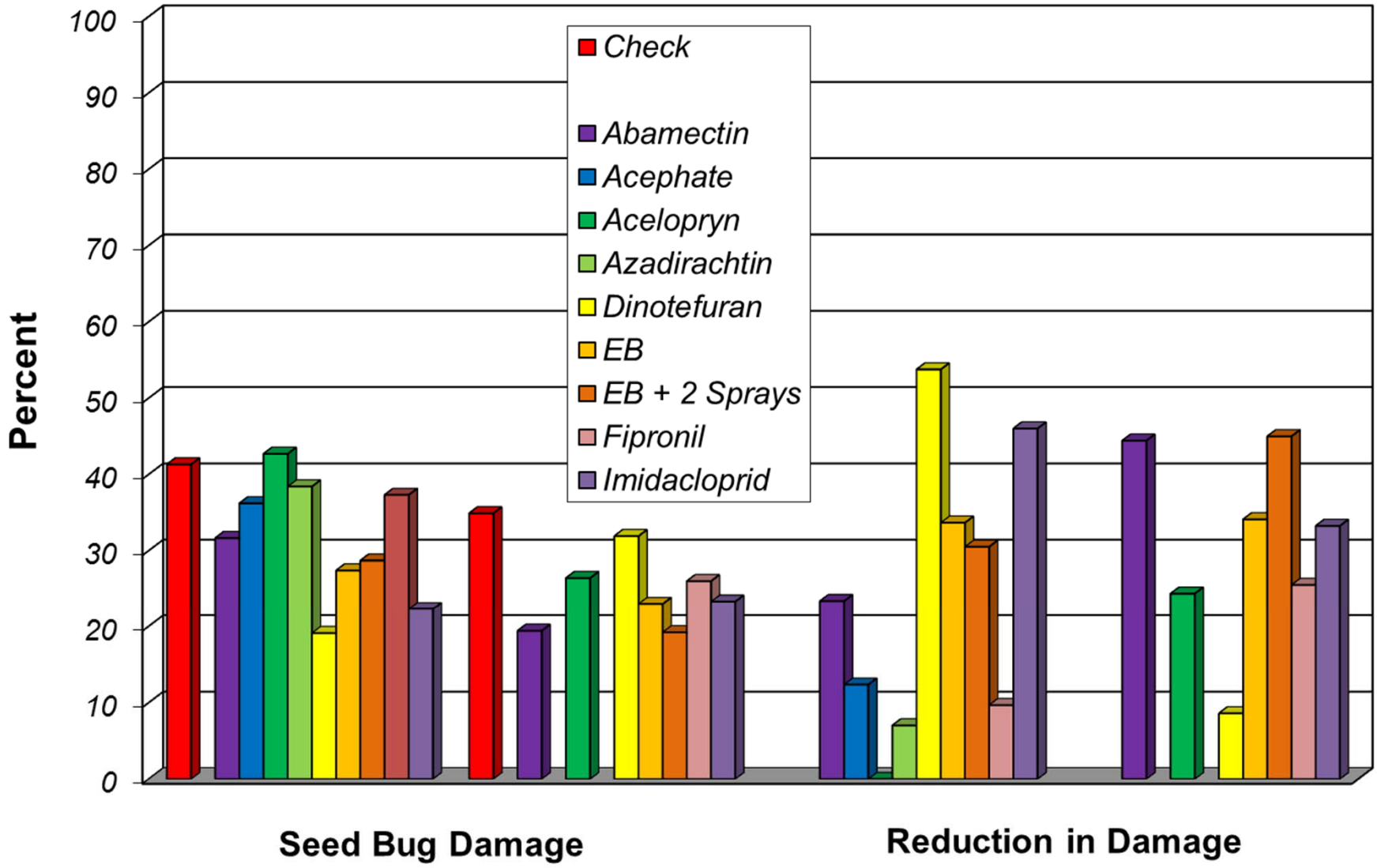
- **Objective – Continue to evaluate potential products for protection of seed crops against pine seed bugs.**

- **Inject seed orchard trees with several different systemic insecticides near Woodville, TX and Magnolia, AR.**

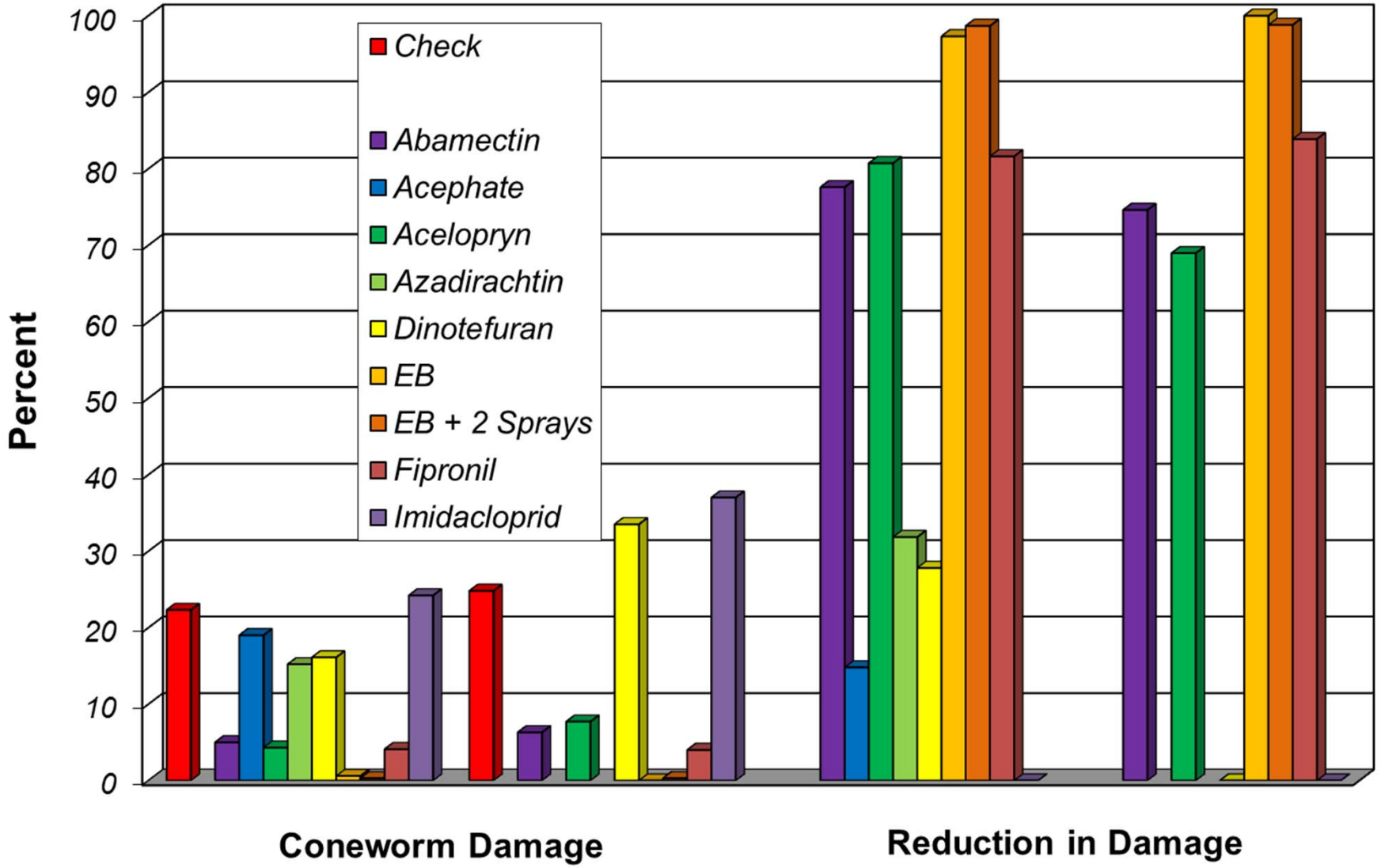
Woodville, TX 2010

	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



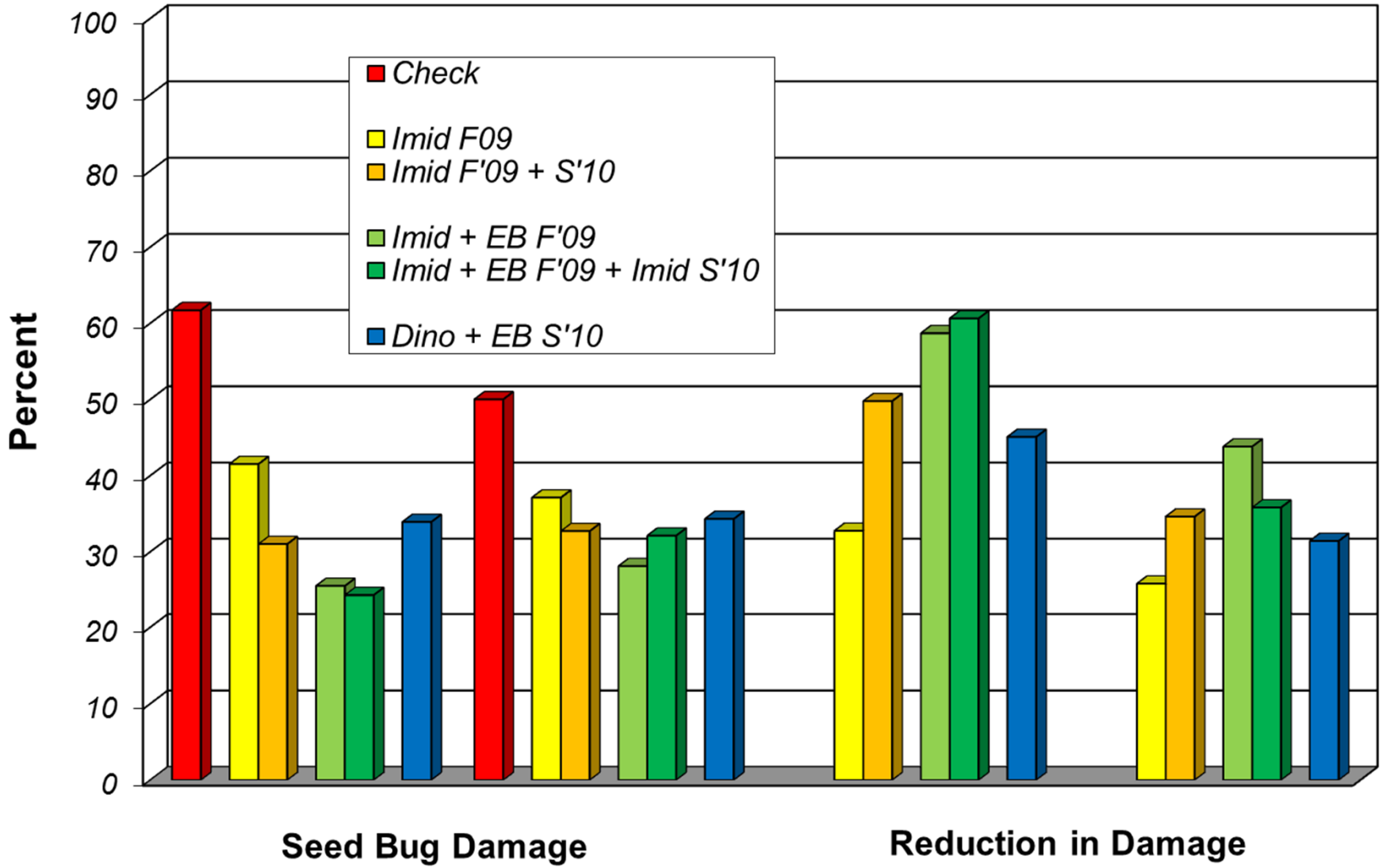
Percent coneworm (*Dioryctria* spp.) damage and reduction in damage compared to check, Woodville, TX 2010 & 2011.



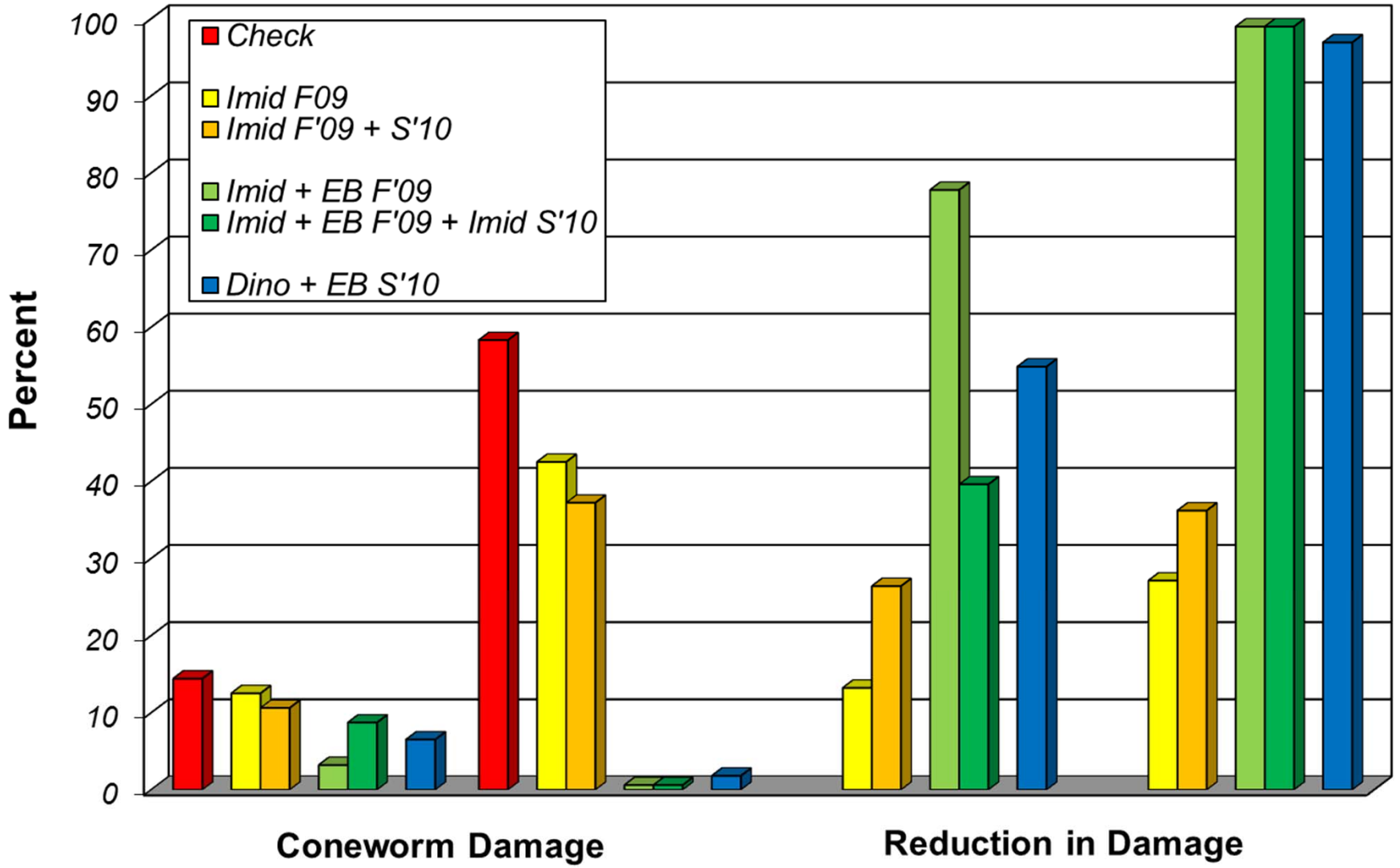
Magnolia, AR 2010

	Oct. 2009		*Apr. 2010*
• *Imidacloprid (Ima-jet®)*	*X*		
• *Imidacloprid*	*X*	*+ Imidacloprid*	*X*
• *Imidacloprid + EB*	*X*		
• *Imidacloprid + EB*	*X*	*+ Imidacloprid*	*X*
• *Dinotefuran + EB*			*X*
• *Check*			

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



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



Potential Research Efforts in 2012 - 2013

- **Continue to evaluate the duration of treatment efficacy in the 3rd year of TX and AR 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 2011

Ips & Dendroctonus Trials

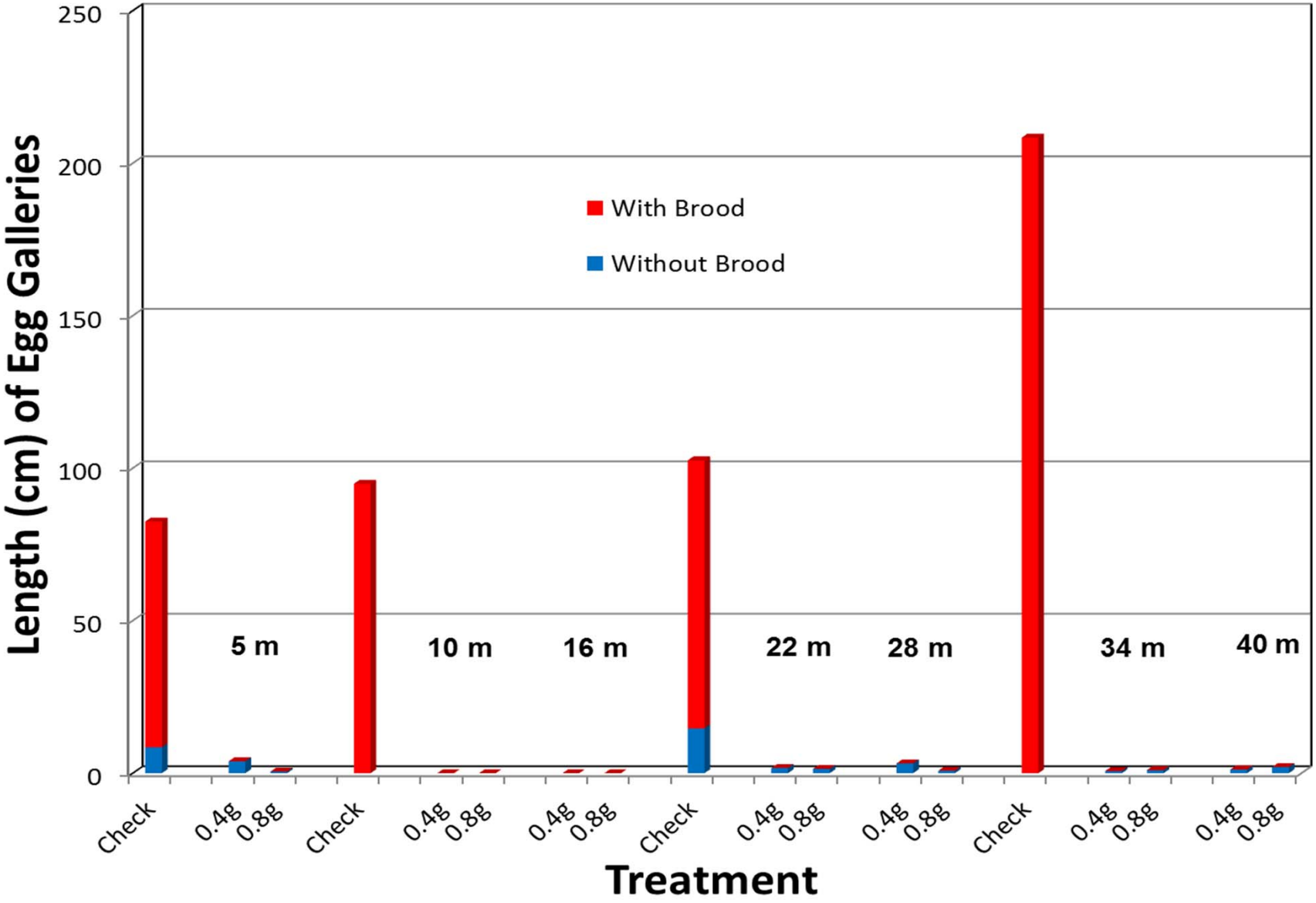
- **Continued trial to evaluate efficacy of abamectin at two rates against *Ips* in TX.**

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

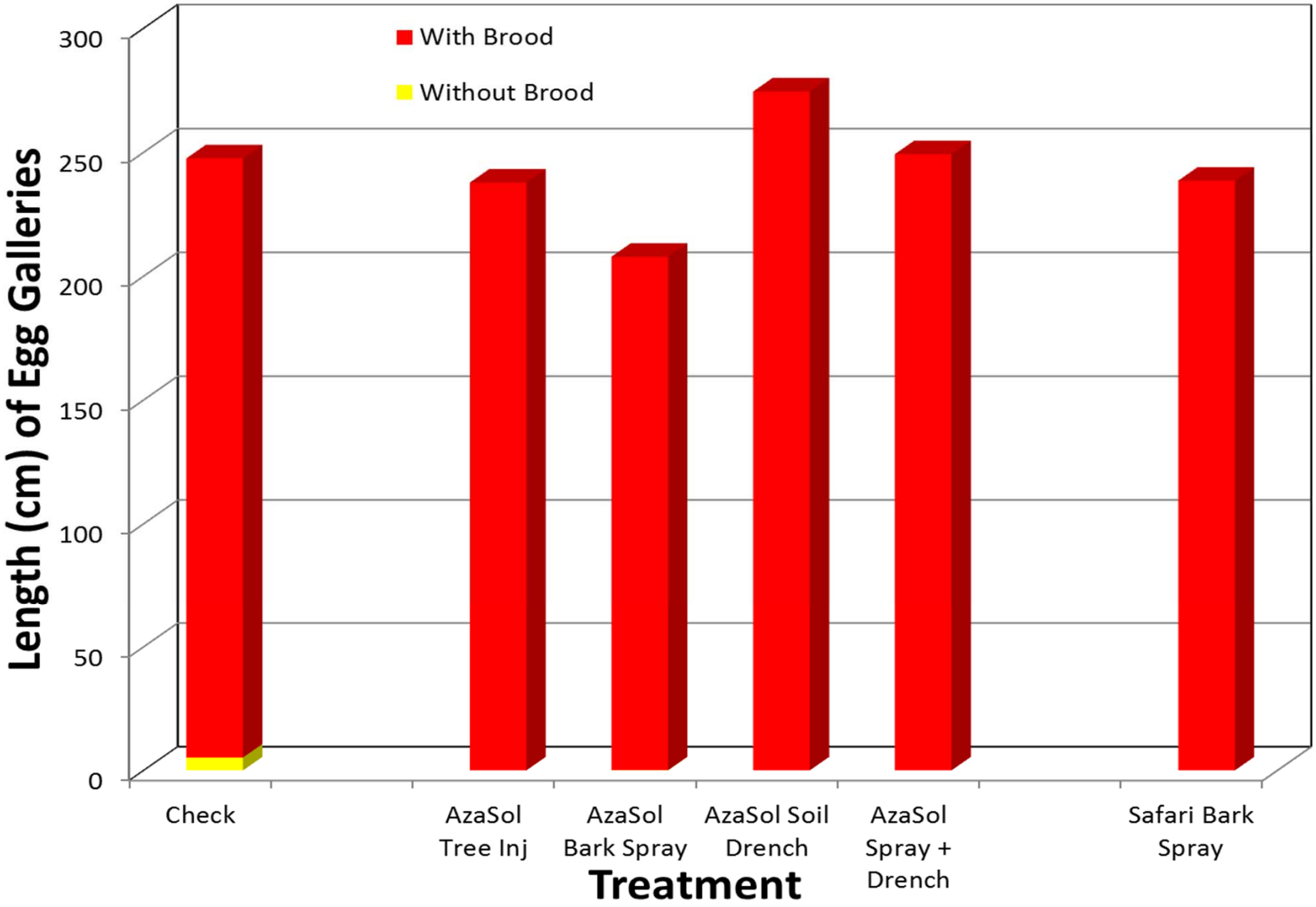
- **Continue evaluation of EB ± fungicide trials for:**

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

Effects and duration of abamectin rates on *Ips* galleries length and brood development in loblolly pine logs : 2008 - 2011.



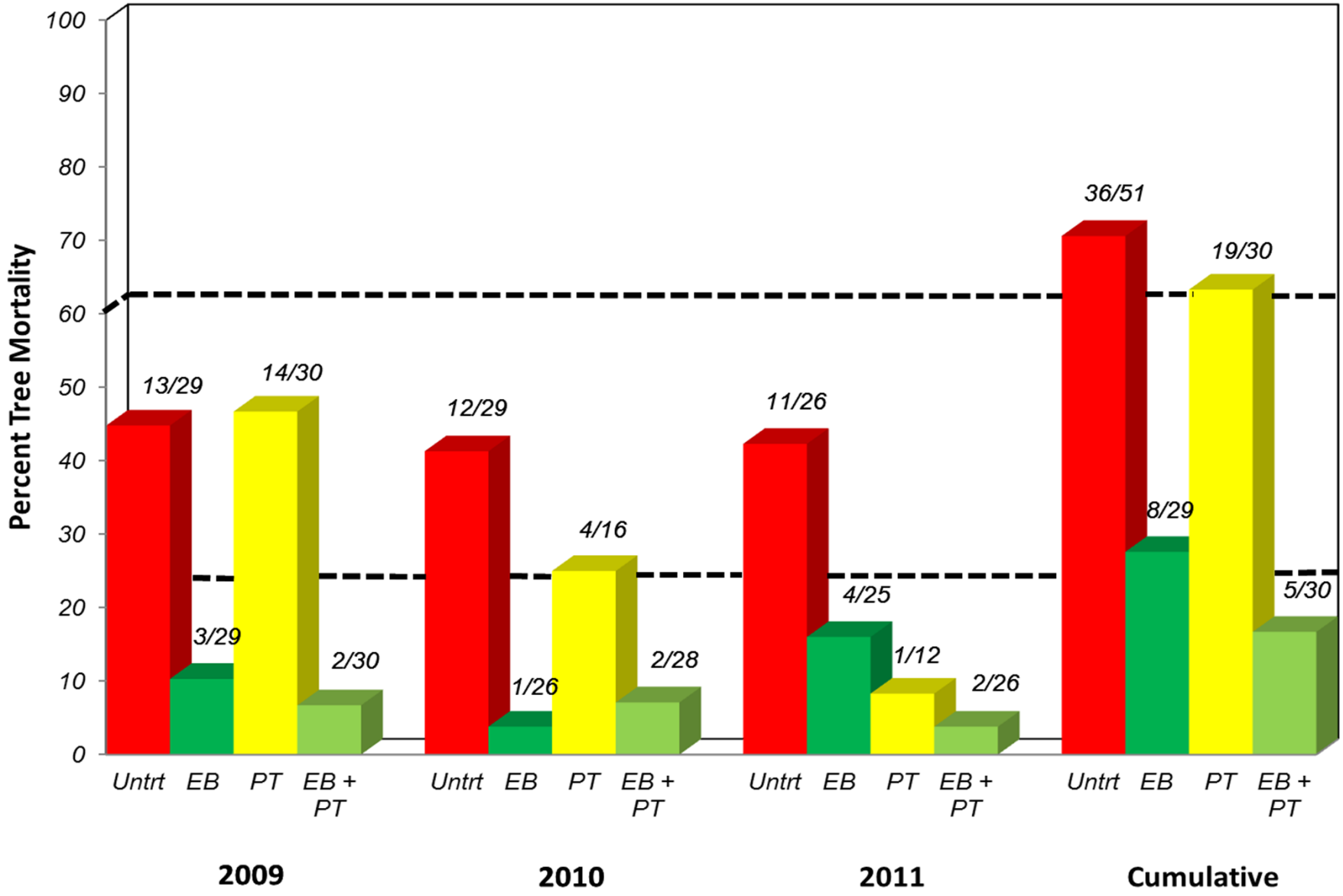
Effects of Azasol and Safari on *Ips* galleries length and brood development in loblolly pine logs 1 month after application.



SPB – Alabama 2009 - 2010

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

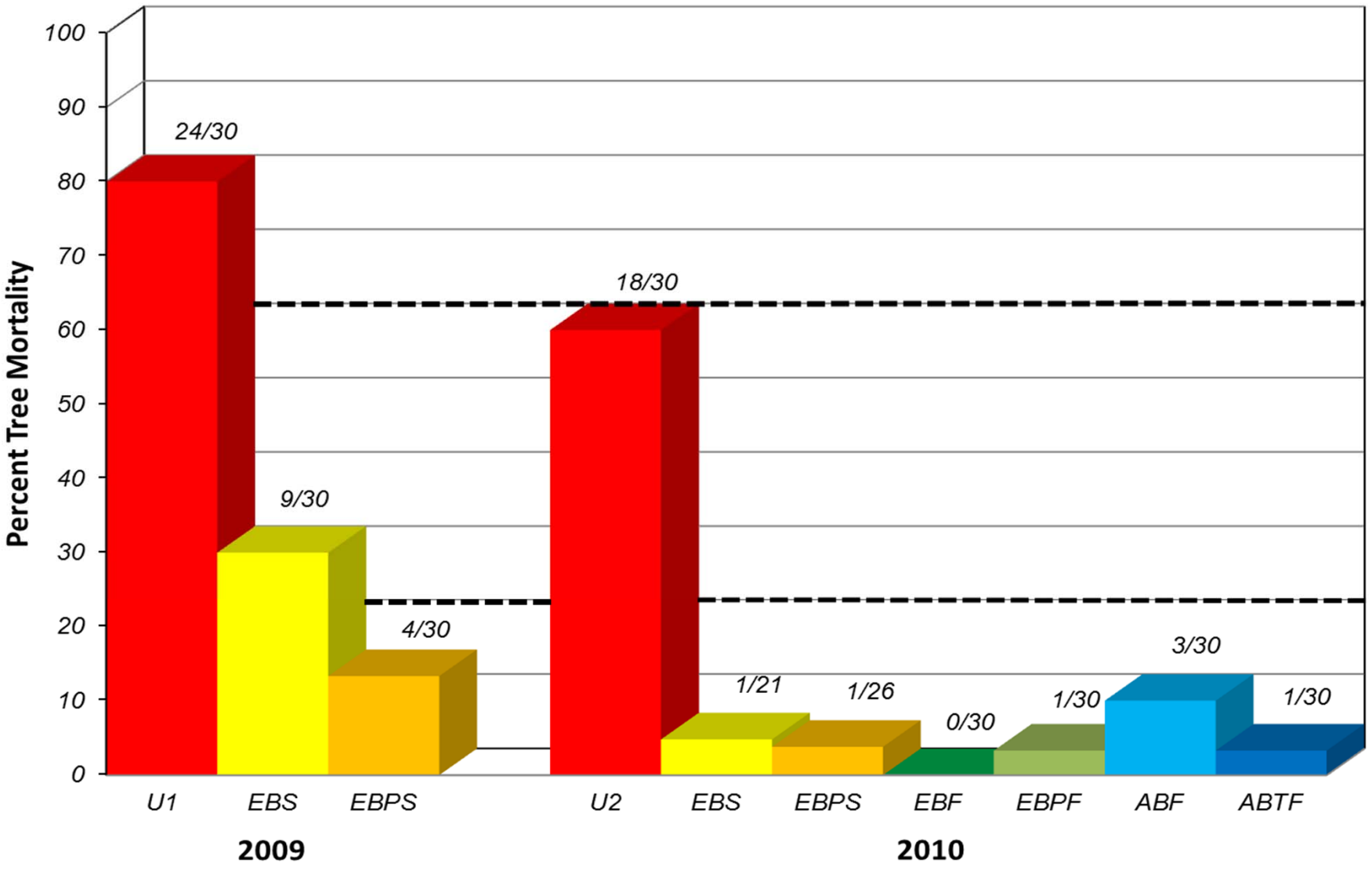
Effect of injection treatments on mortality of loblolly pine by southern pine beetle; Talladega N.F., Oakmulgee R.D., AL: 2009 - 2011



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		

Effect of injection treatments on mortality of lodgepole pine by mountain pine beetle; Uinta-Wasatch-Cache N.F., UT: 2009 - 2010



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

Systemic Injection for Oak Pests: 2009

Objective

- **Evaluate emamectin benzoate (TREE-äge) for protection of oaks against potential pests, including wood borers and defoliators.**

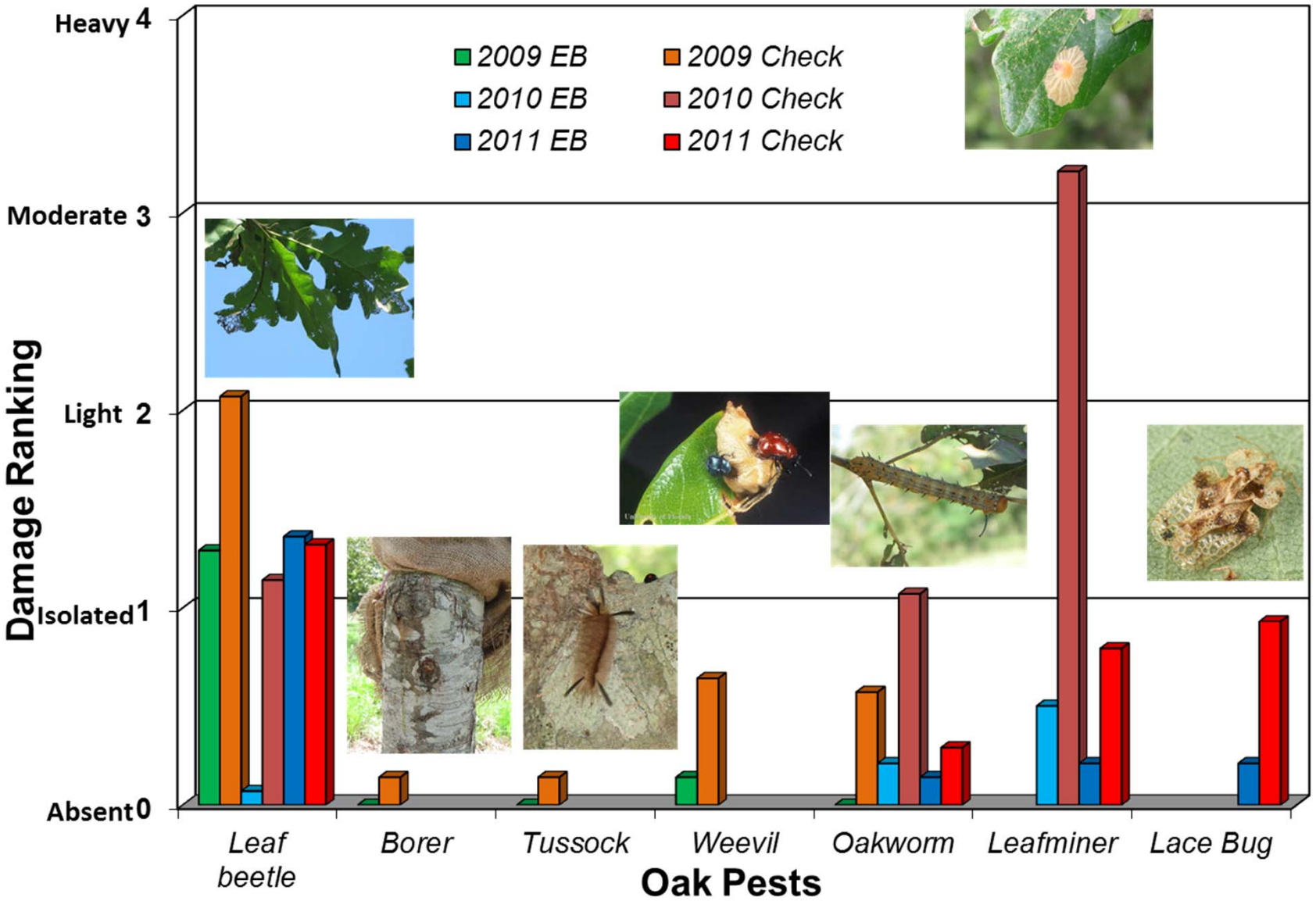
Research Efforts in 2009 & 2010

Oak Pest Trials

- **Injected cherrybark oak and bur oak with TREE-äge™ (EB) at Hudson Hardwood Orchard in April 2009.**

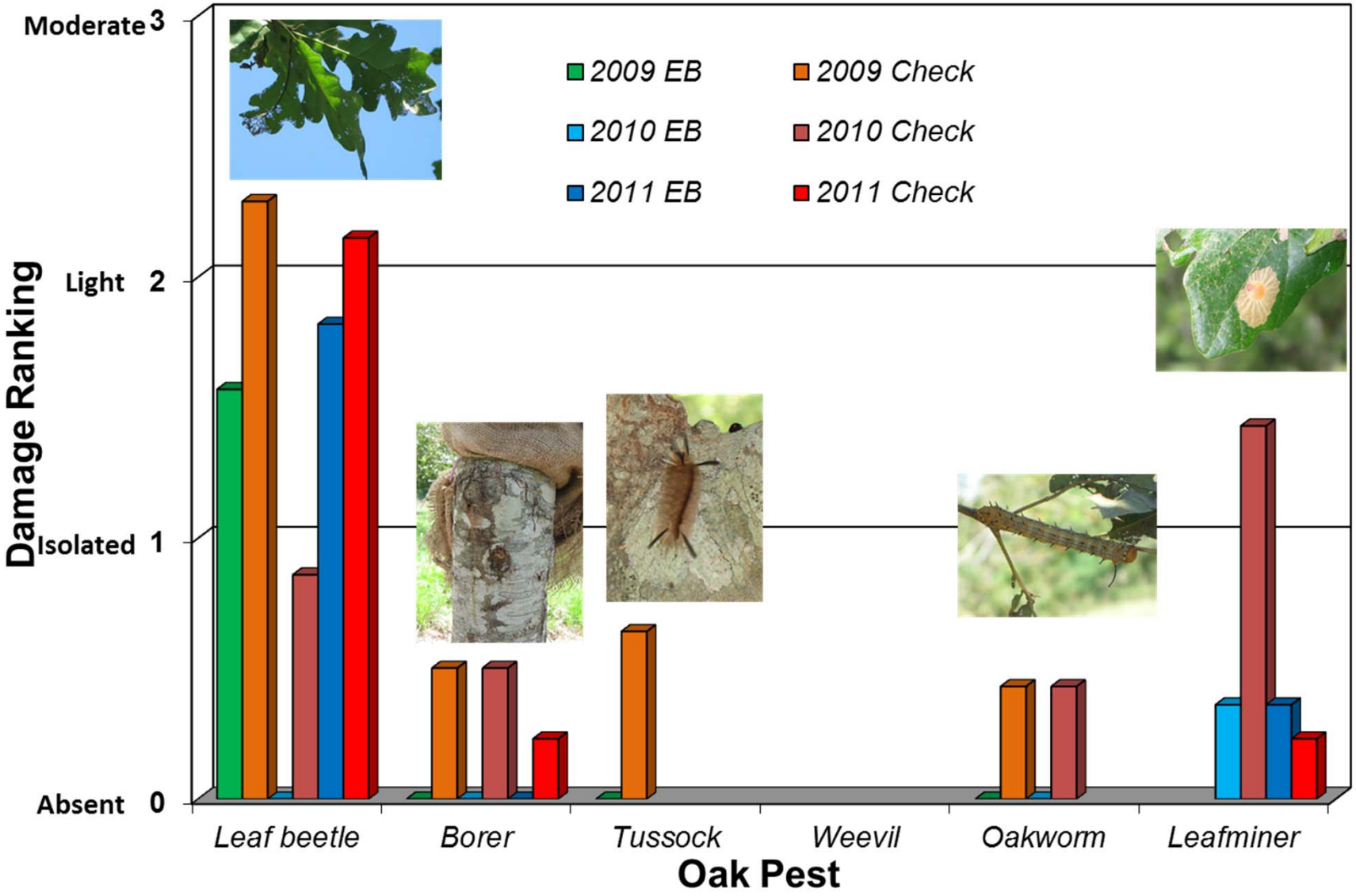
- **Visually monitor occurrence and severity of insects attacking cherrybark and bur oaks in 2009 and 2010.**

Effect of emamectin benzoate injection on occurrence of oak pests on bur oak; Hudson, TX: 2009 - 2011



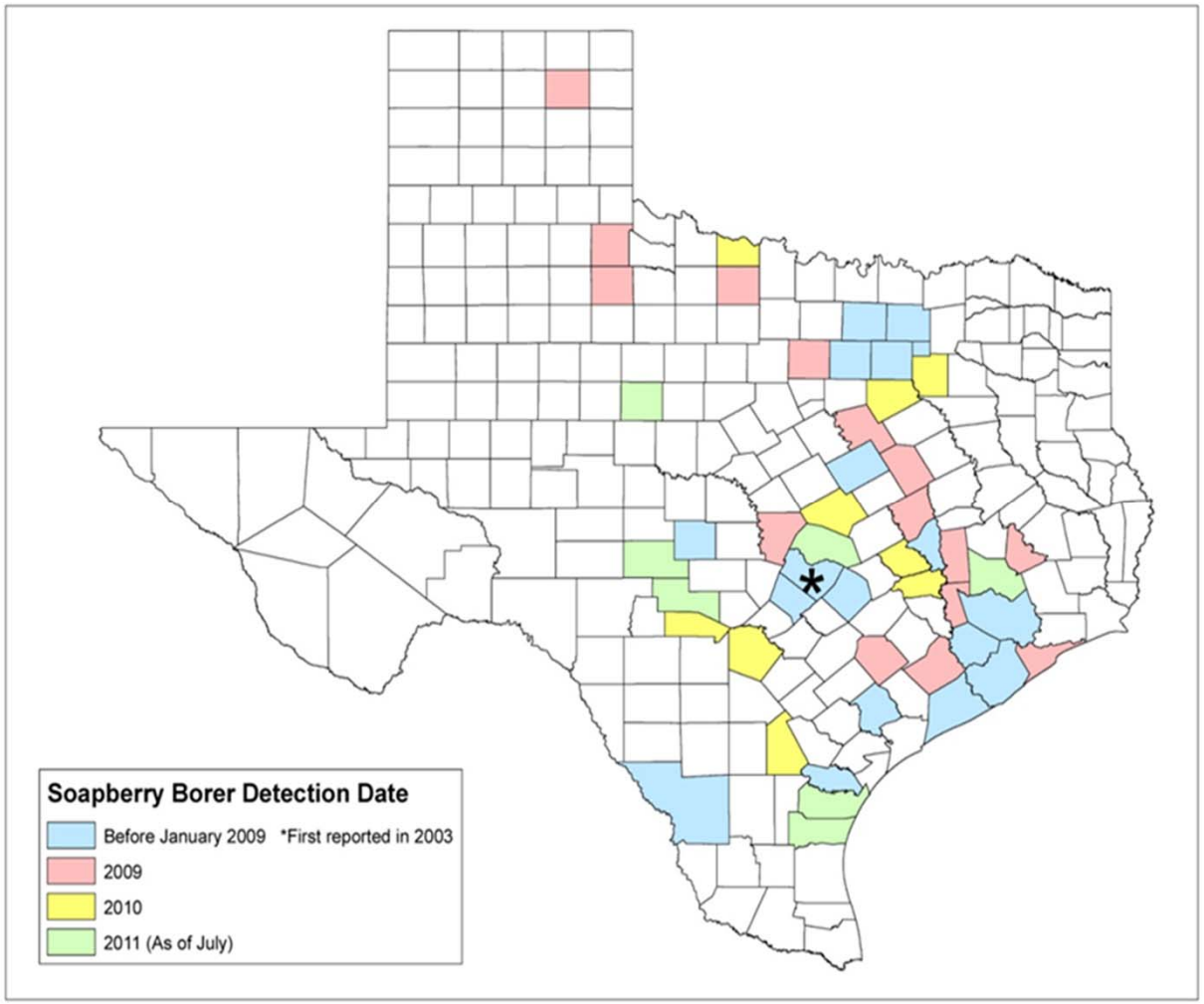
Damage Ranking: 0 = Absent; 1=Isolated; 2=Light; 3=Moderate; 4=Heavy; 5=Extensive

Effect of emamectin benzoate injection on occurrence of oak pests on cherrybark oak; Hudson, TX: 2009 - 2011



Damage Ranking: 0 = Absent; 1=Isolated; 2=Light; 3=Moderate; 4=Heavy; 5=Extensive

The soapberry borer (Agrilus prionurus), a native of Mexico, was first reported in Bastrop County, TX in 2003. Since then, it has been detected in 48 additional counties, including the cities of Dallas, Austin, Houston and Corpus Christi,, and is causing extensive mortality of western soapberry.



Control Trial

- **Four to eight trees (2”–18” DBH) were selected in TX near Richmond (S of Houston), Allen (NE of Dallas) and Mesquite (E of Dallas).**

- **In early June and July 2009, these trees were injected with emamectin benzoate (0.16g AI/cm DBH) using Arborjet’s Quik-jet (below right) or Tree IV.**

- **An equal number of trees were selected at each site and monitored as untreated controls.**

Untreated Soapberry

Moderate to heavy epicormic branching

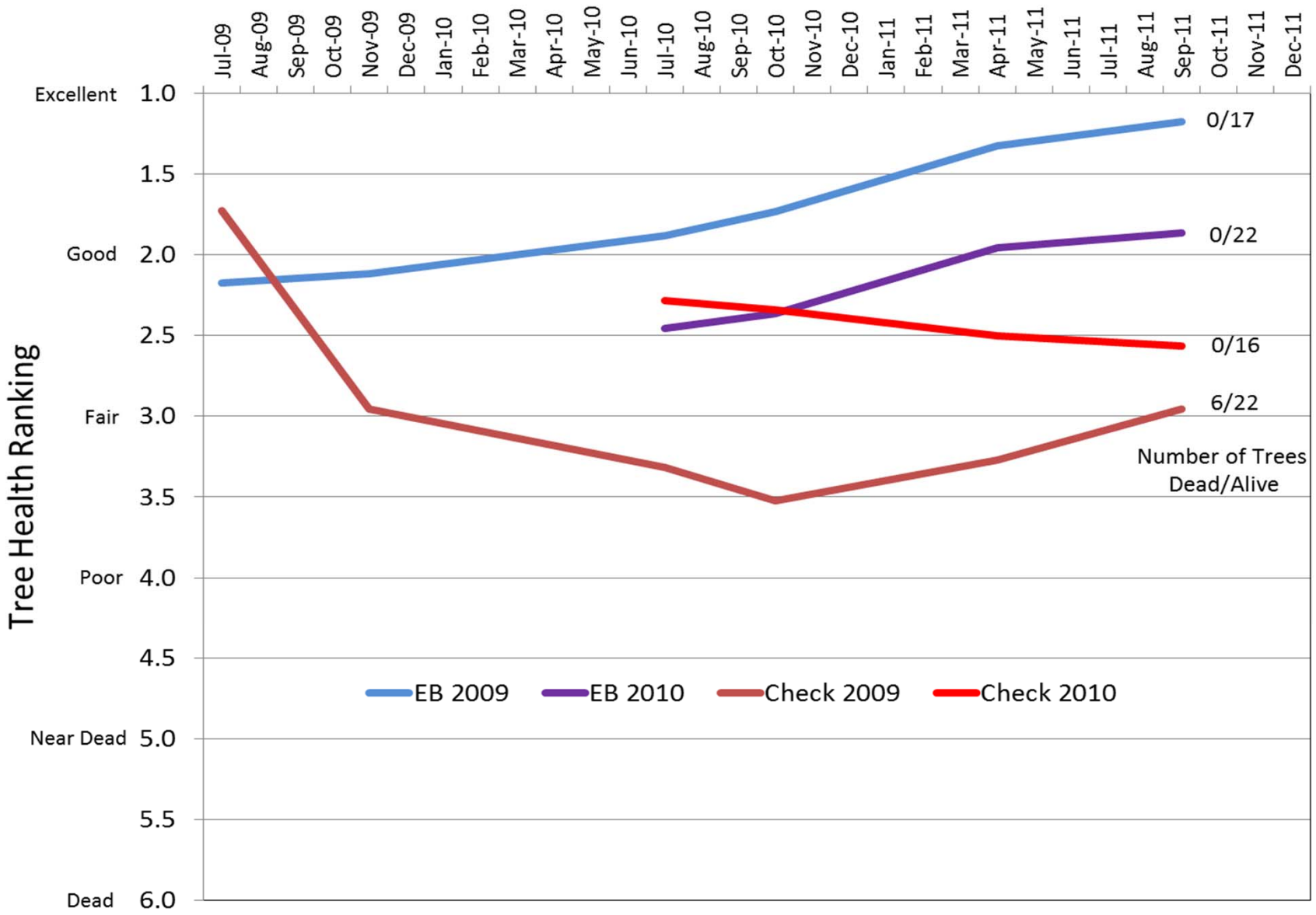
Larger trees had flaking bark and emergence holes.

EB-Treated Soapberry

Healing wounds

Little or no epicormic branching

Effects of EB treatments on health of western soapberry in central Texas, 2009 - 2011.



Status of Product Registration

- **EPA approved the full registration (Section 3) of emamectin benzoate (TREE-äge™) use on ash against emerald ash borer in July 2009. In December 2010, EPA approved additional uses - " for control of mature and immature arthropod pests of deciduous, coniferous and palm trees, including, but not limited to, those growing in residential and commercial landscapes, parks, plantations, seed orchards, and forested sites (in private, municipal, state, tribal and national areas)."**

- **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 lable.**

Break Time!

Injection System Evaluation

Chemjet

Pine Infuser

Portle

Macroinjection

Mauget

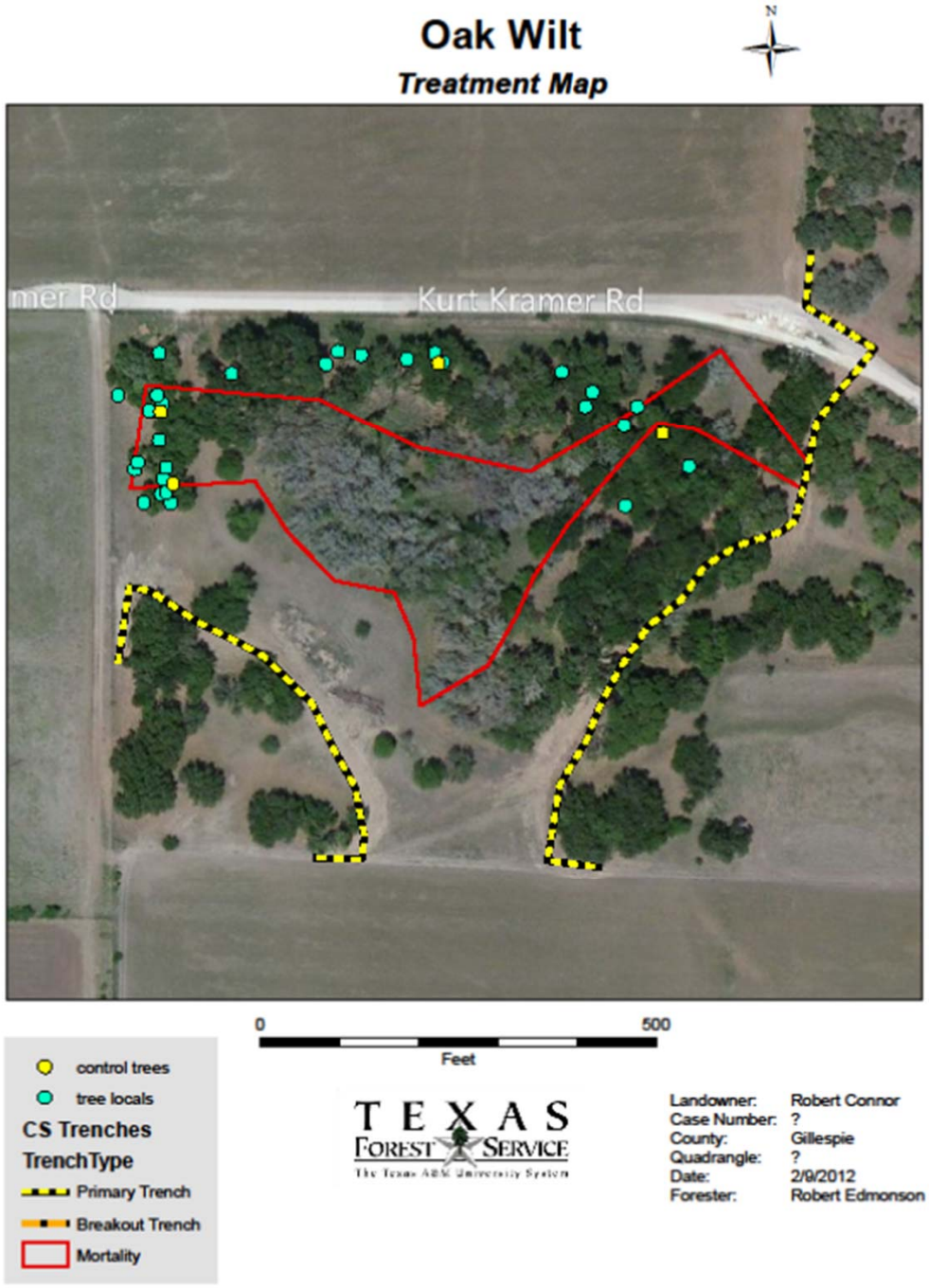
Tree IV

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

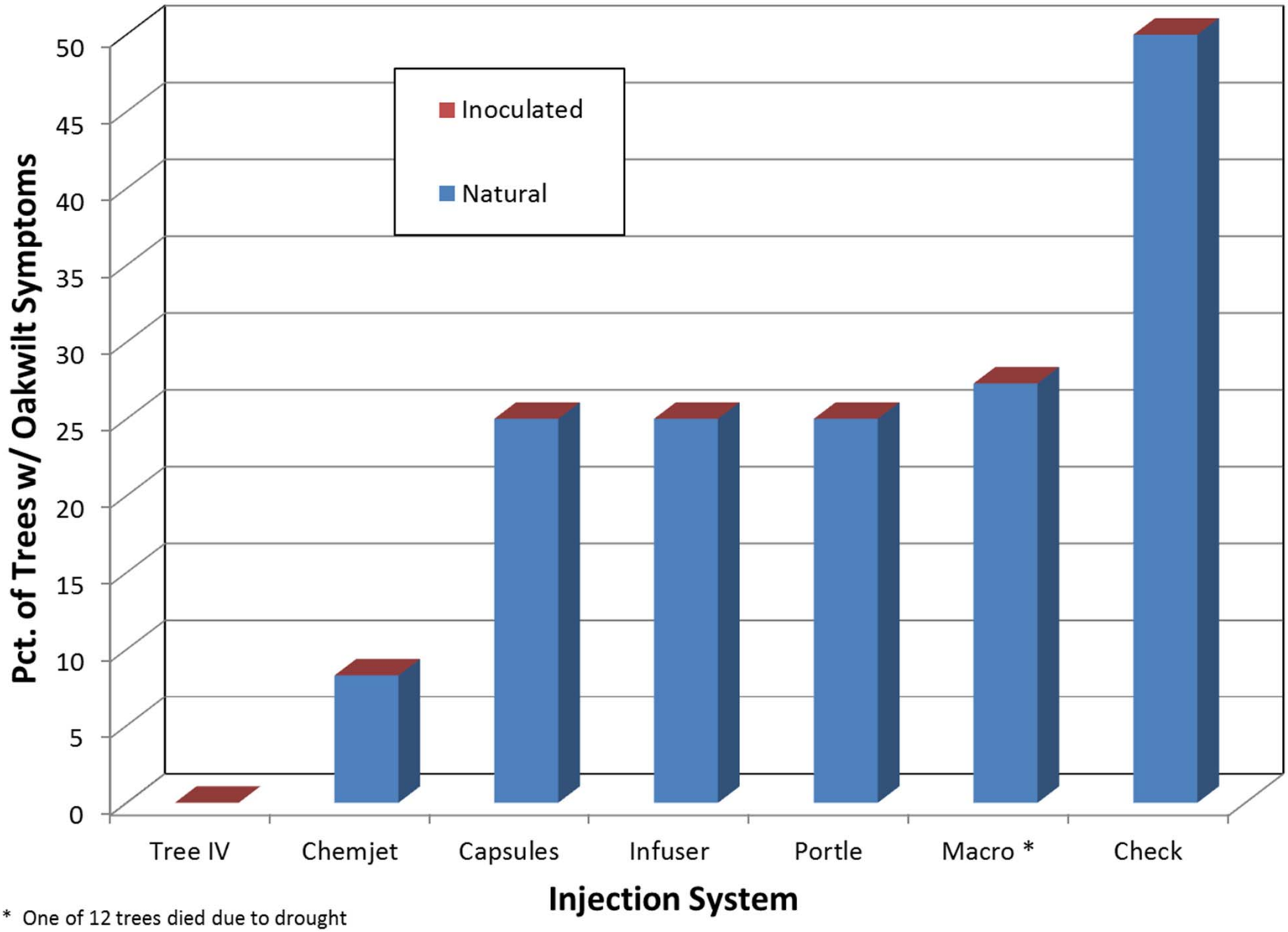


Four groups of 7 trees selected near each oak wilt center.

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.



* One of 12 trees died due to drought

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.**

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.**

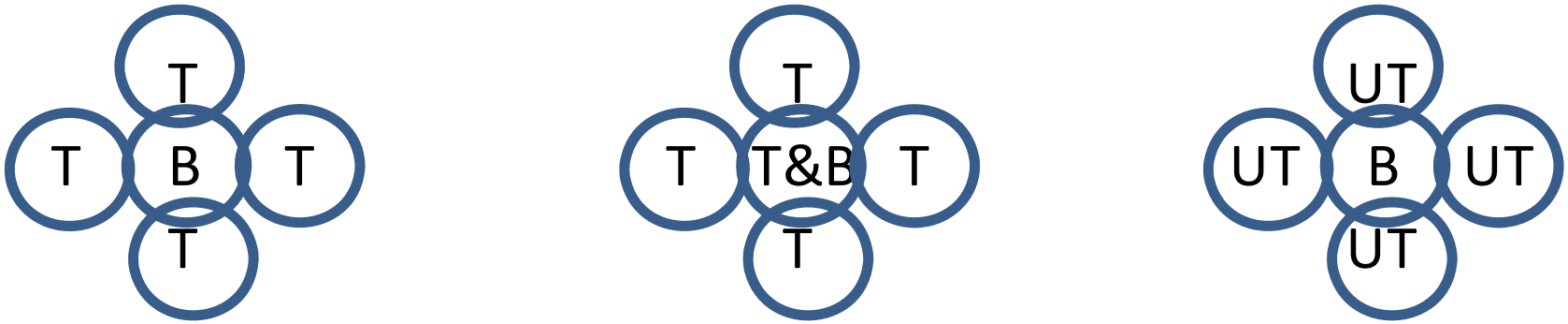
- **Treatments:**

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).

Block 1



B = Bait only, T = Treat only, T&B - Treat & Bait, UT - untreated

Each tract = predominantly loblolly, >30 acres, >30 YO, basal area >100

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**

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.

EPA Concerns

- **<u>Leaching of Active Ingredient (AI)</u>:**
  Application of PTM into cells early in the growing season and subsequent watering will result in leaching of some (1-3%) AI out of cells – up to 3 lbs AI / acre.

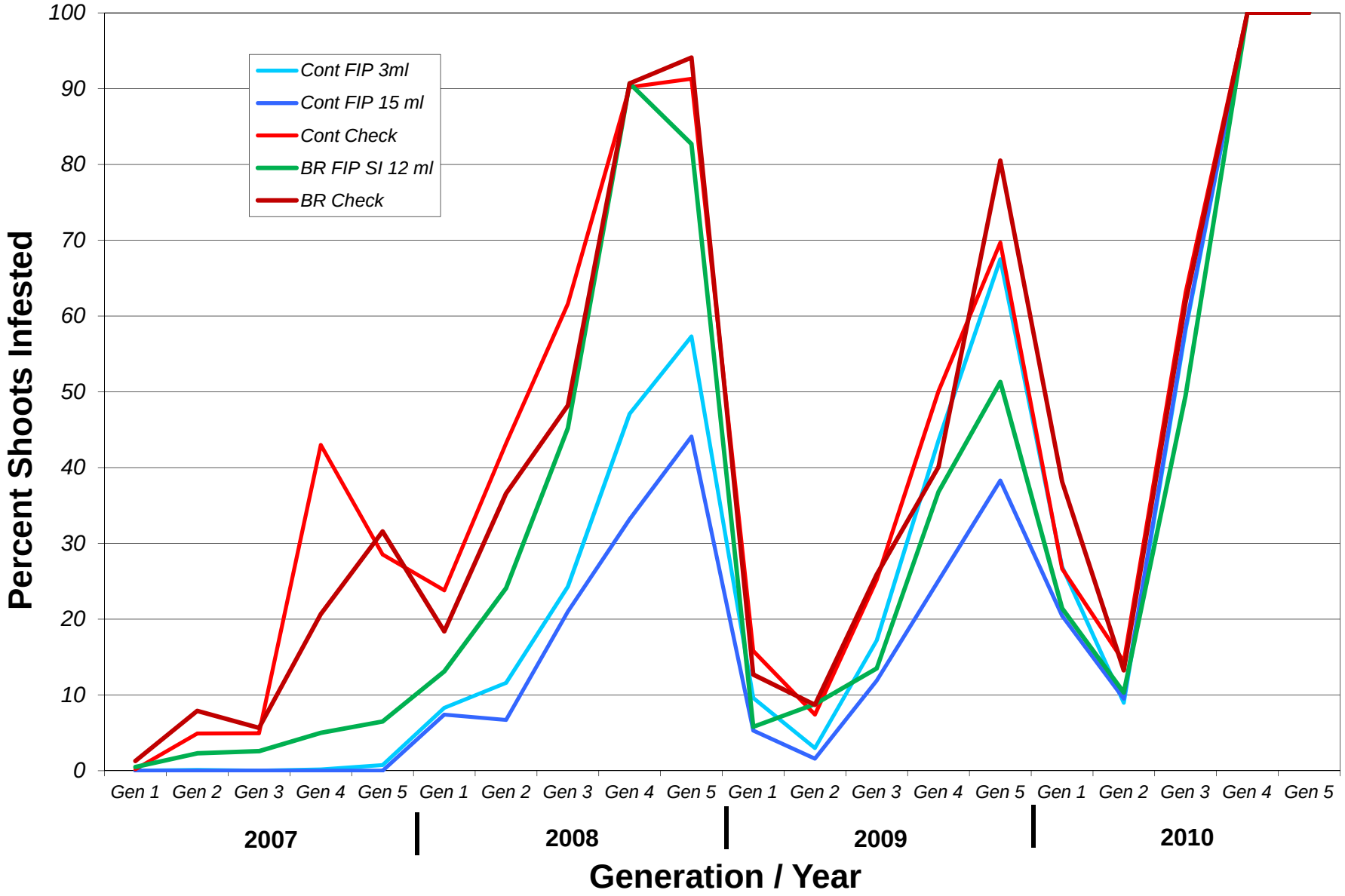
- **<u>Worker Exposure</u>:**
  Seedling packers and planters usually hold seedlings at the plug. Workers will be exposed to AI present on the surface of the plug.

Research Efforts in 2011

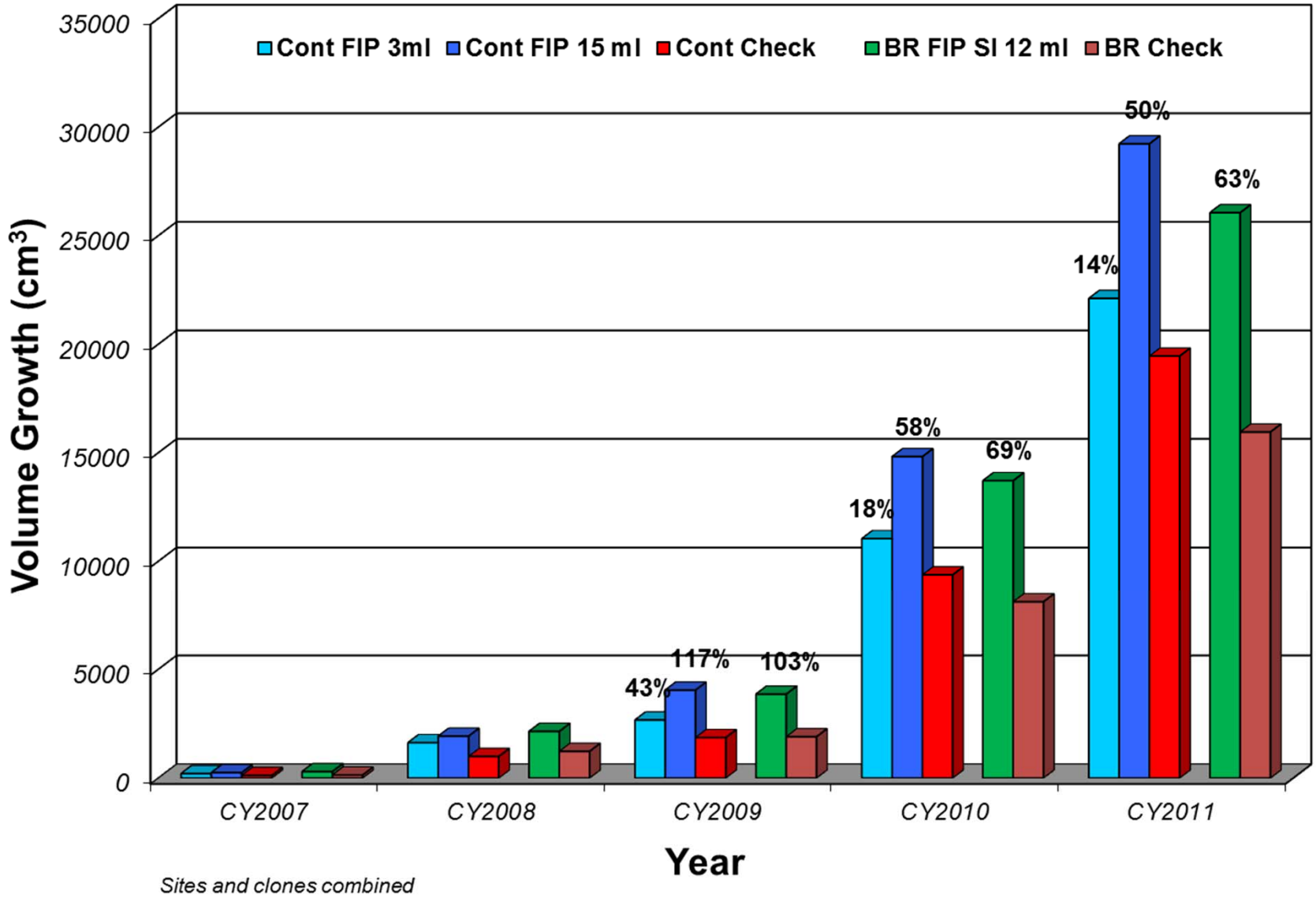
- **Continue to evaluate efficacy of PTM™ applied to containerized seedlings.**

- **Continue to evaluate efficacy of PTM™ applied one year after planting at different rates, placement, volume.**

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



Effects of fipronil soil treatment on volume (cm^3) growth of containerized and bareroot loblolly pine on 2 sites: 2007 - 2010



PTM™ Applicators

PTM™ Spot Gun

PTM™ Injection Probe

2008

Day System - TX

Machine Planters Fitted with Soil Injection Systems

2011

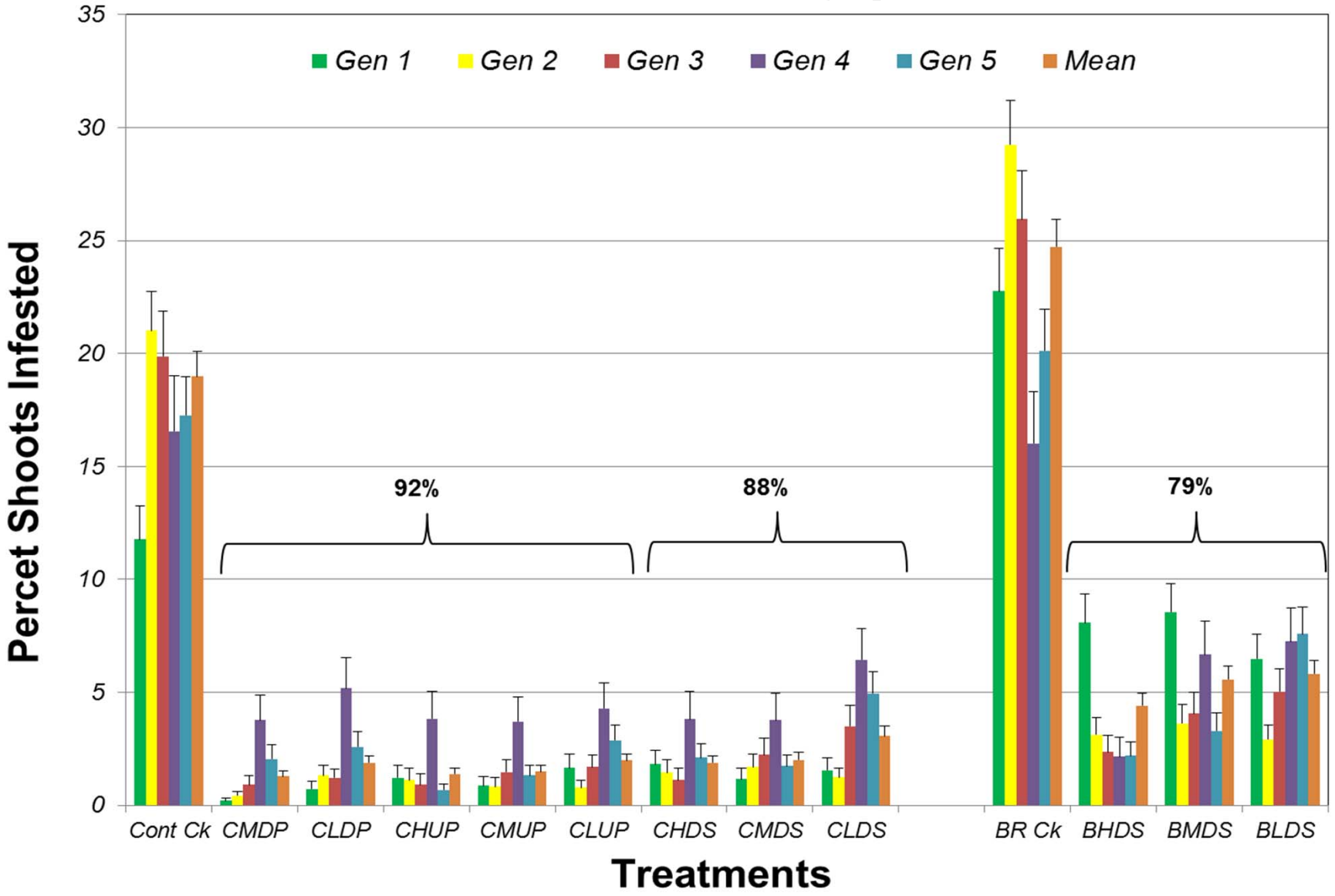
Dowden System - LA

PTM™ for Containerized Seedlings - 2011

	PI	*SI*	*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

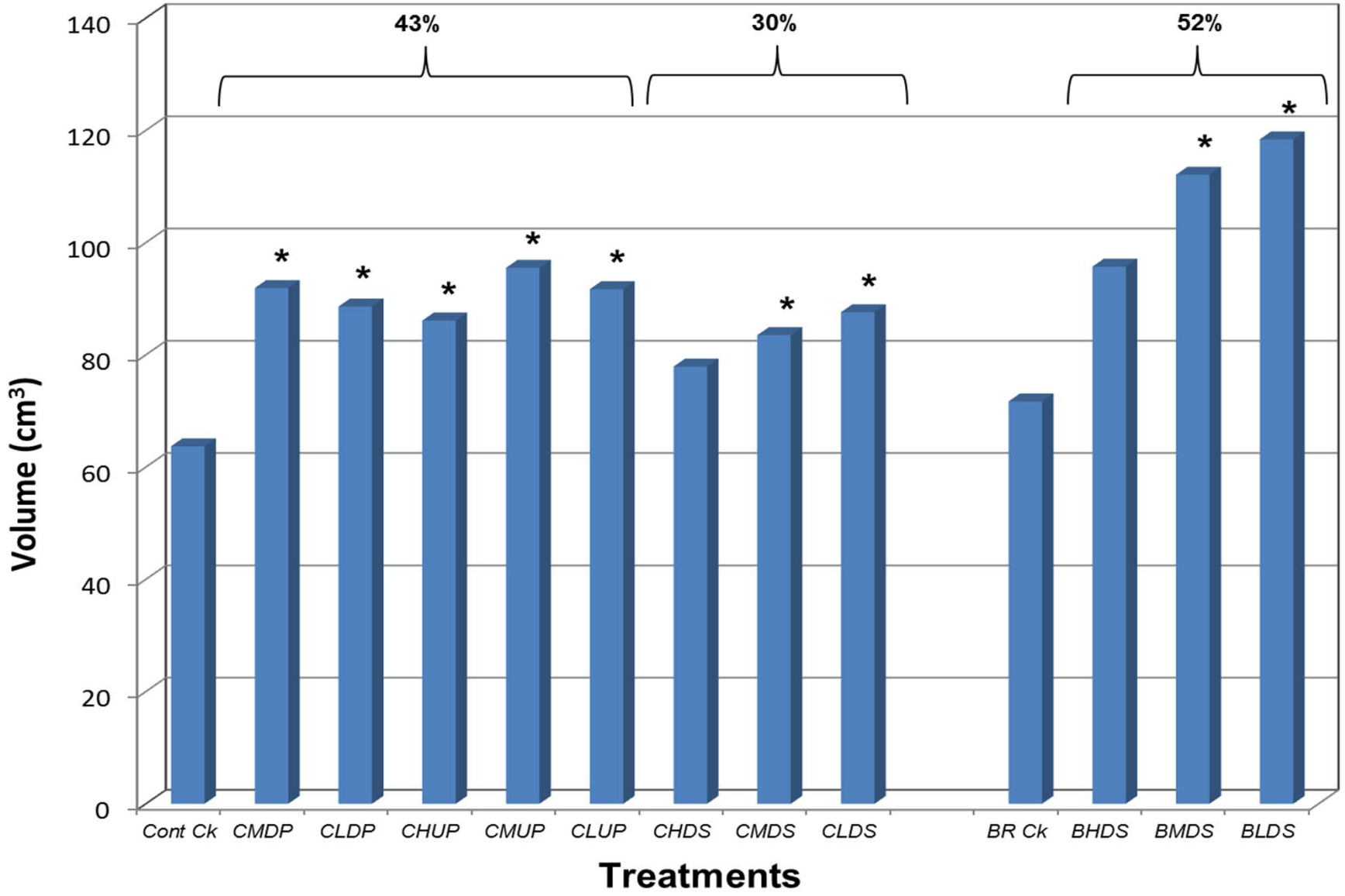
Plug Injection Trial – Site Distribution - 2011

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

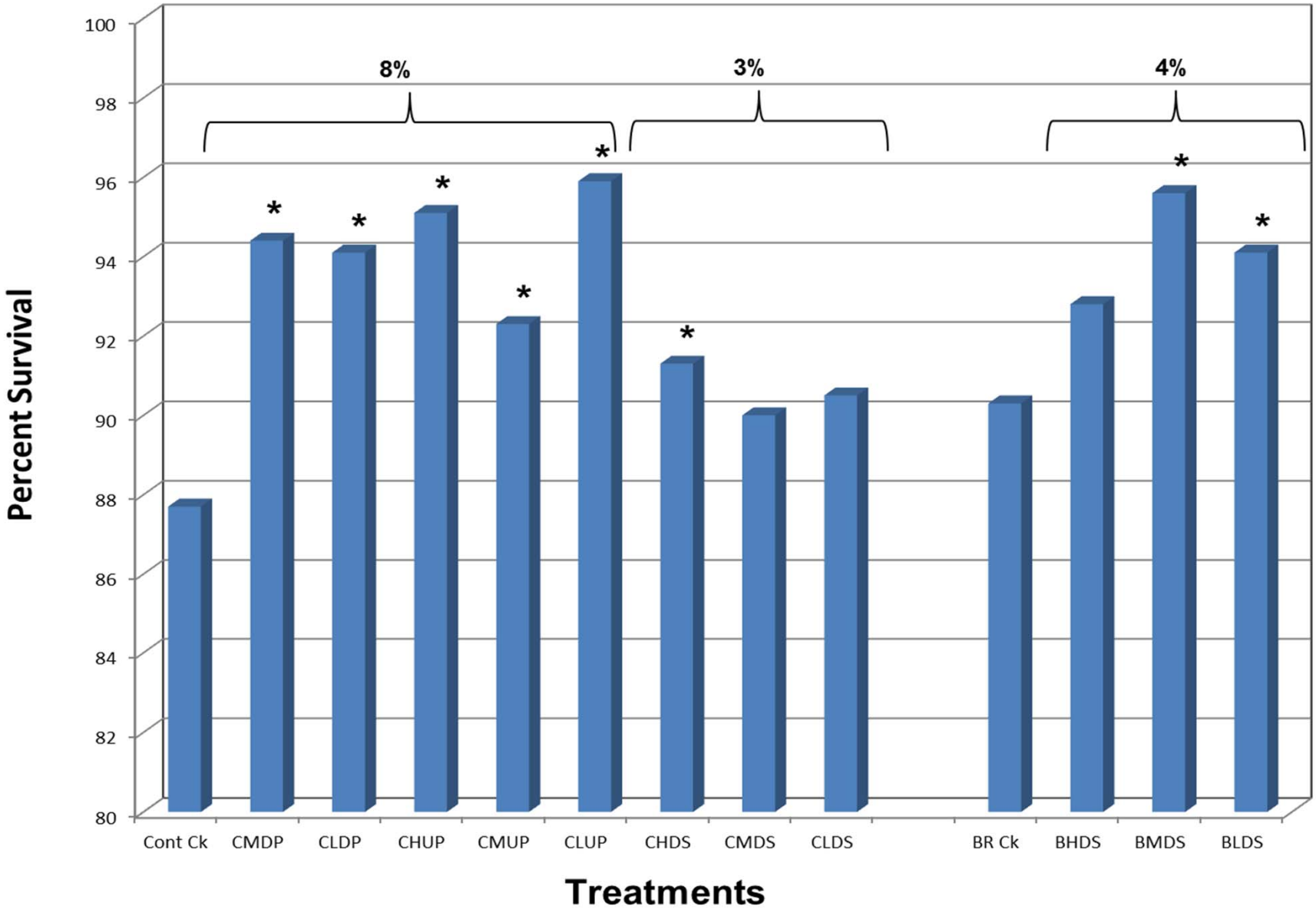


C= Containerized; B= Bareroot; L= Low rate; M= Medium rate; H= High rate; D= Dilute; U= Undilute; P= Plug injection; S= Soil injection

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



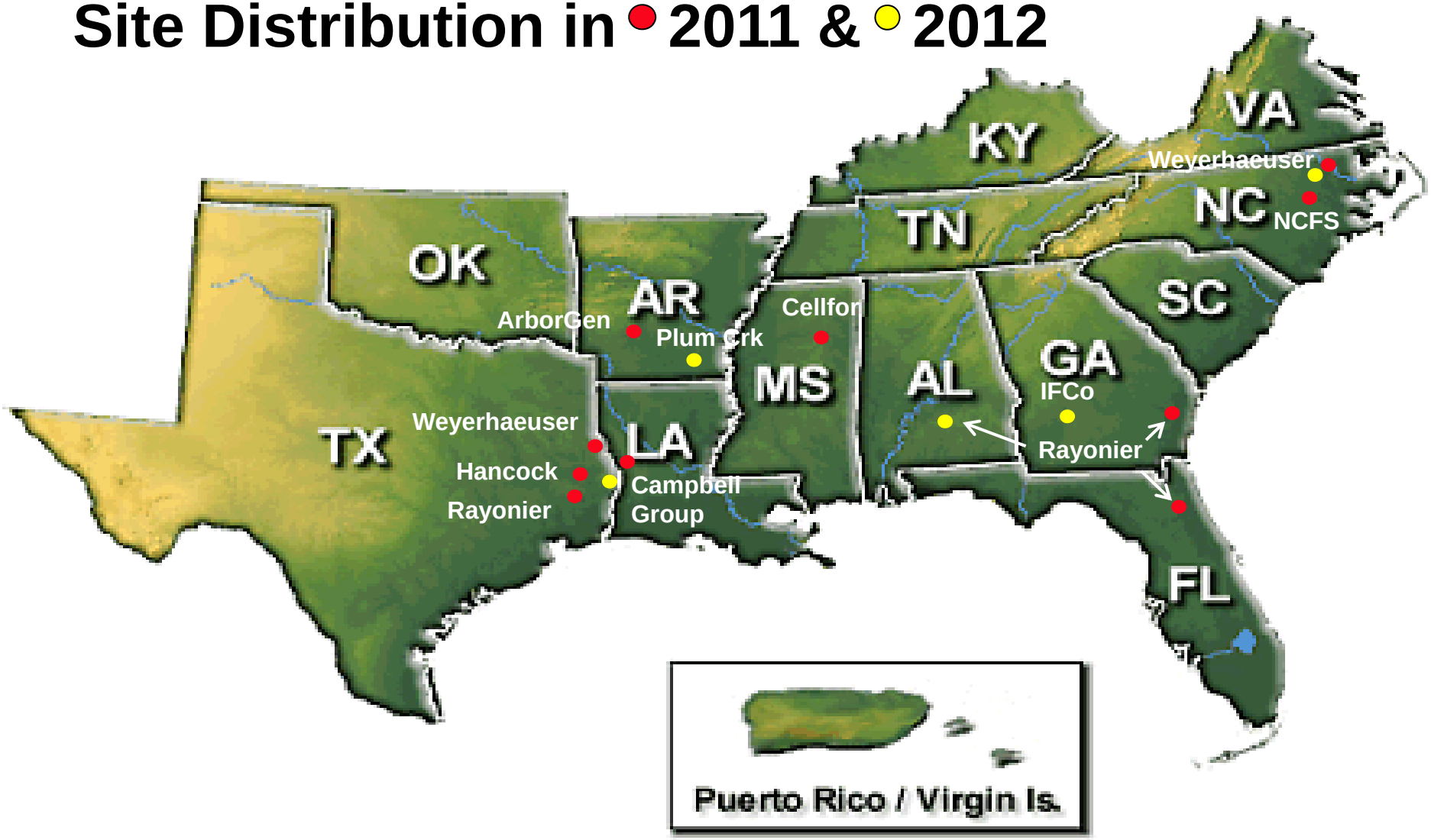
Effects of fipronil treatment on survival of containerized and bareroot loblolly pine on 10 sites: 2011



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



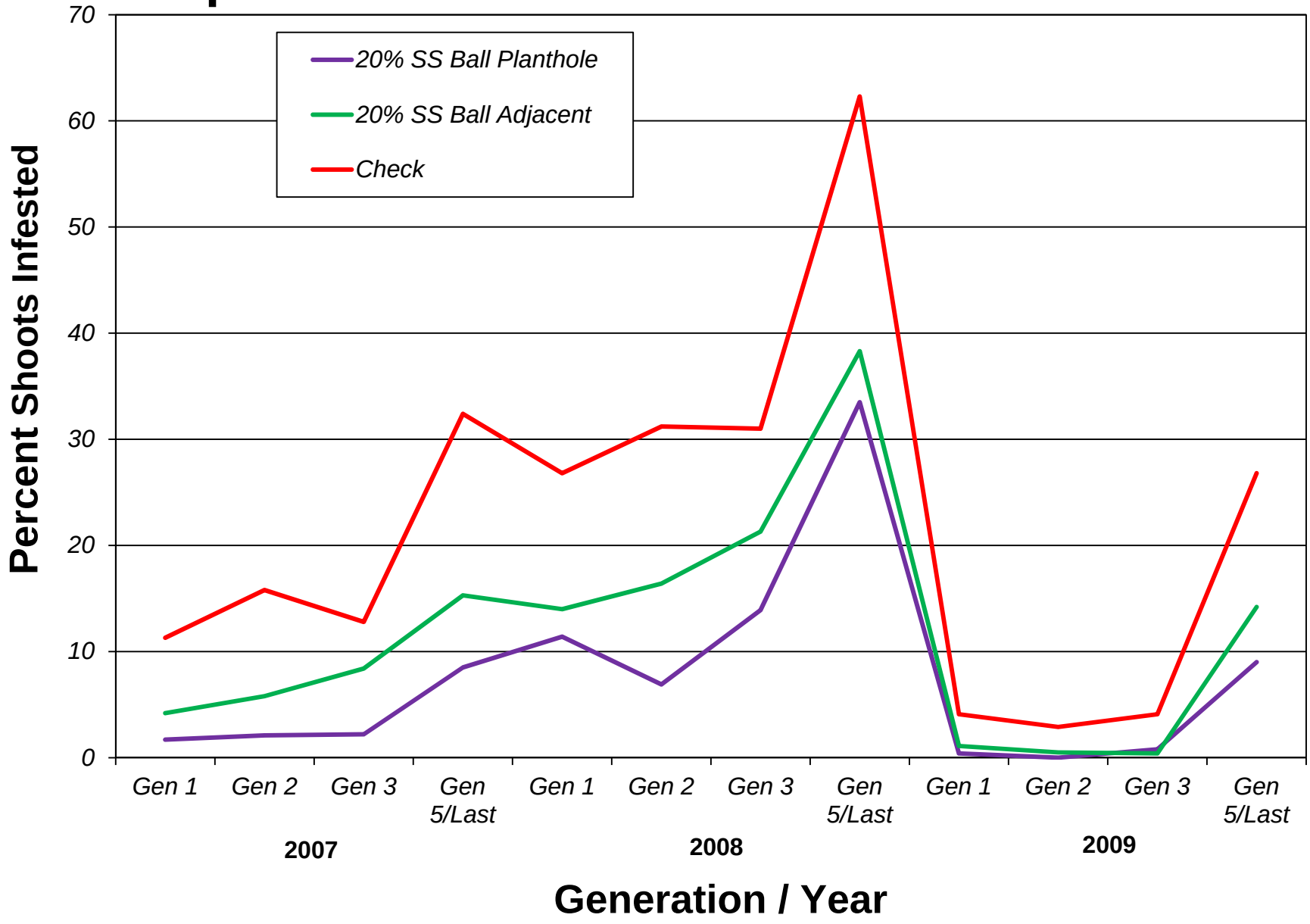
SilvaShield™ Forestry Tablet (imidacloprid)

- **SilvaShield™ Forestry Tablet was registered with EPA in December 2006. It is now registered in all states, except CA.**
- **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.**

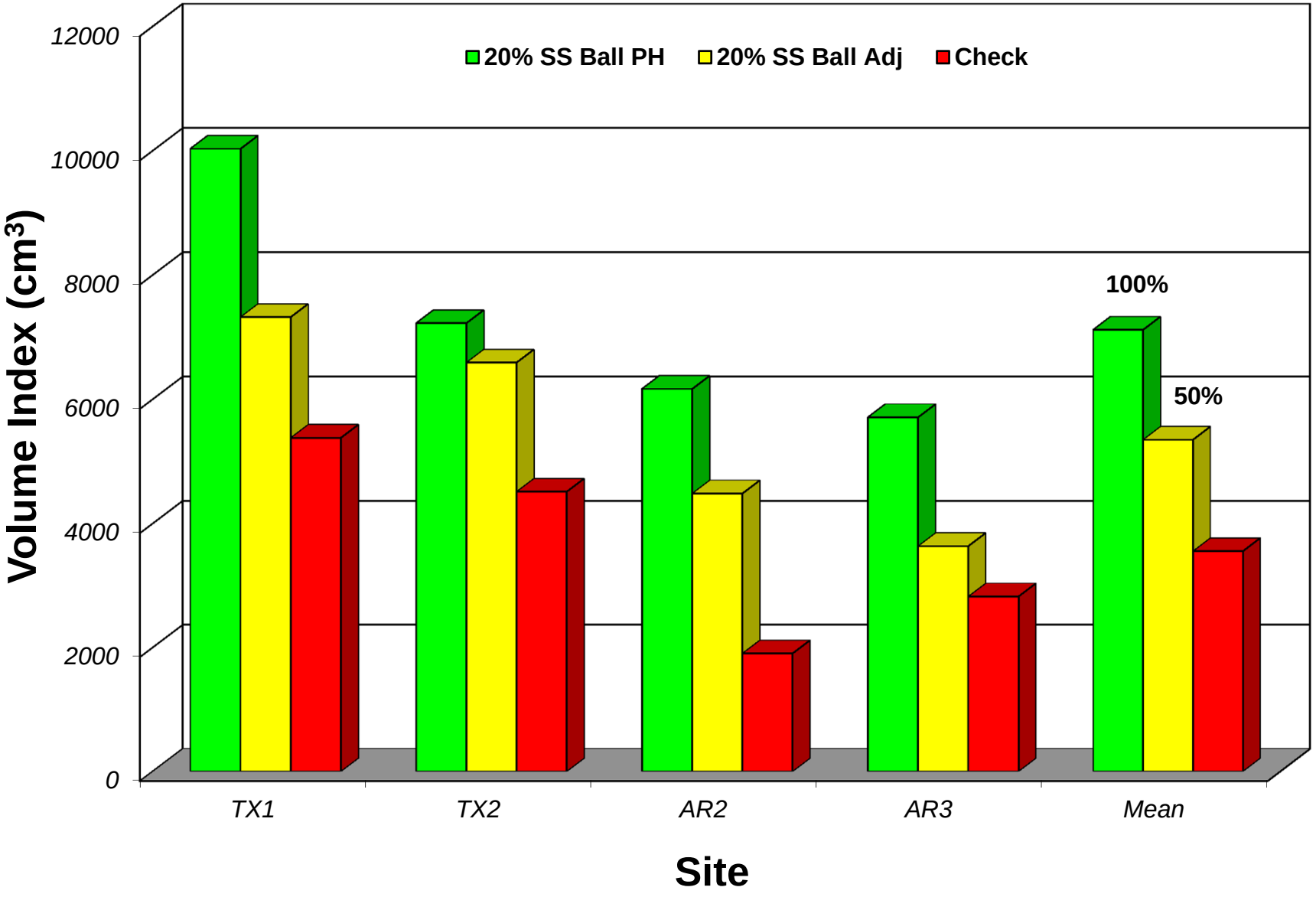
Research Efforts in 2011

- Continued to monitor growth effects of SilvaShield™ tablet against pine tip moth on 4 sites (2 in AR and 2 in TX).
- Continue to monitor efficacy of SilvaShield™ applied at different rates (# of tablets) and depths for control of pine tip moth.
- Continue to evaluate efficacy of SilvaShield™ in reducing area-wide pine tip moth damage.
- Initiated trial to compare effects of SilvaShield™ alone and combined with fertilizer and/or weed control.

Effect of SilvaShield™ tablets and placement on tip moth infestation – 5 sites: 2007 - 2009



Effect of SilvaShield™ tablets and placement on volume growth (cm^3) – 4 sites: 2010



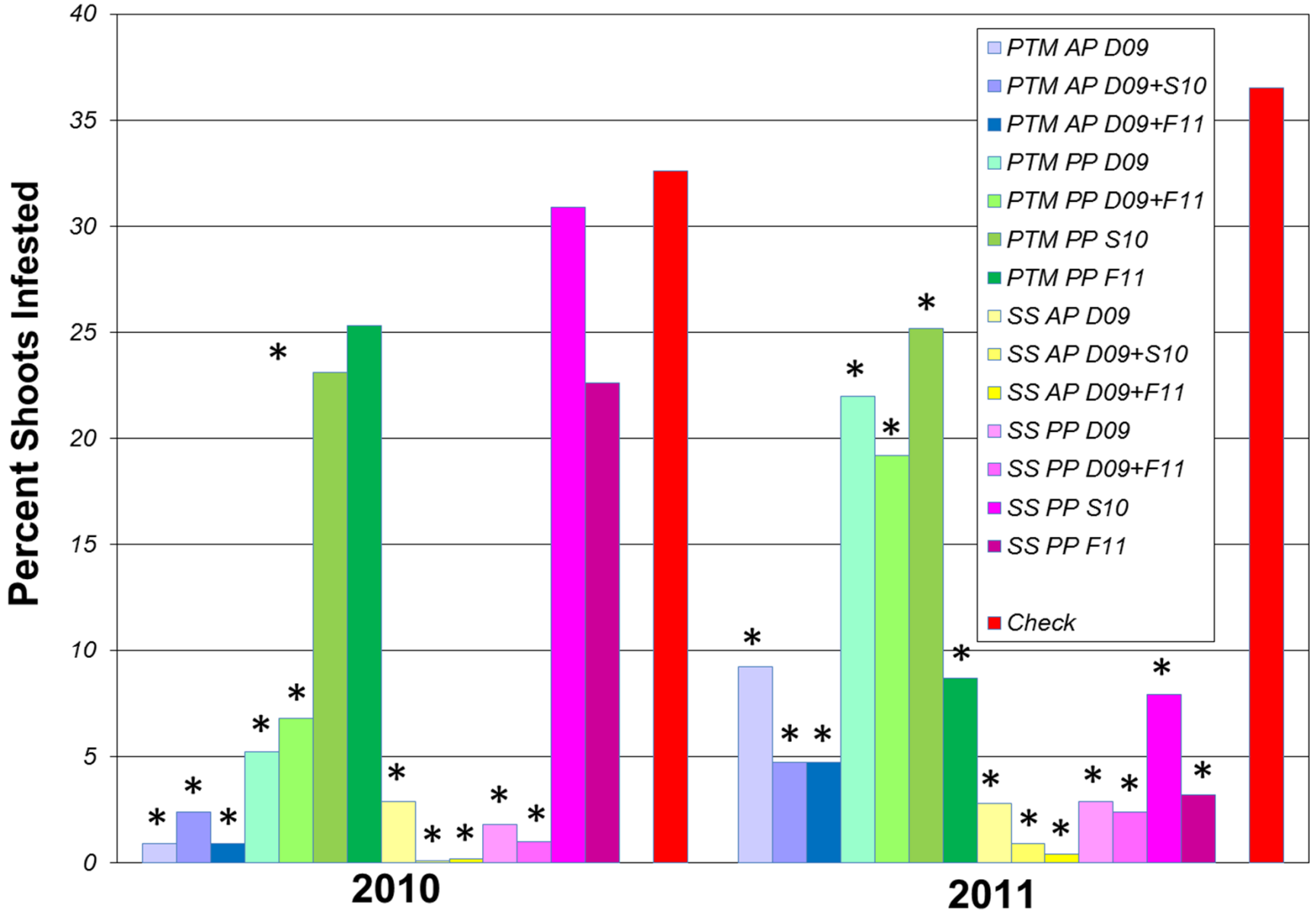
Conclusions

- **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

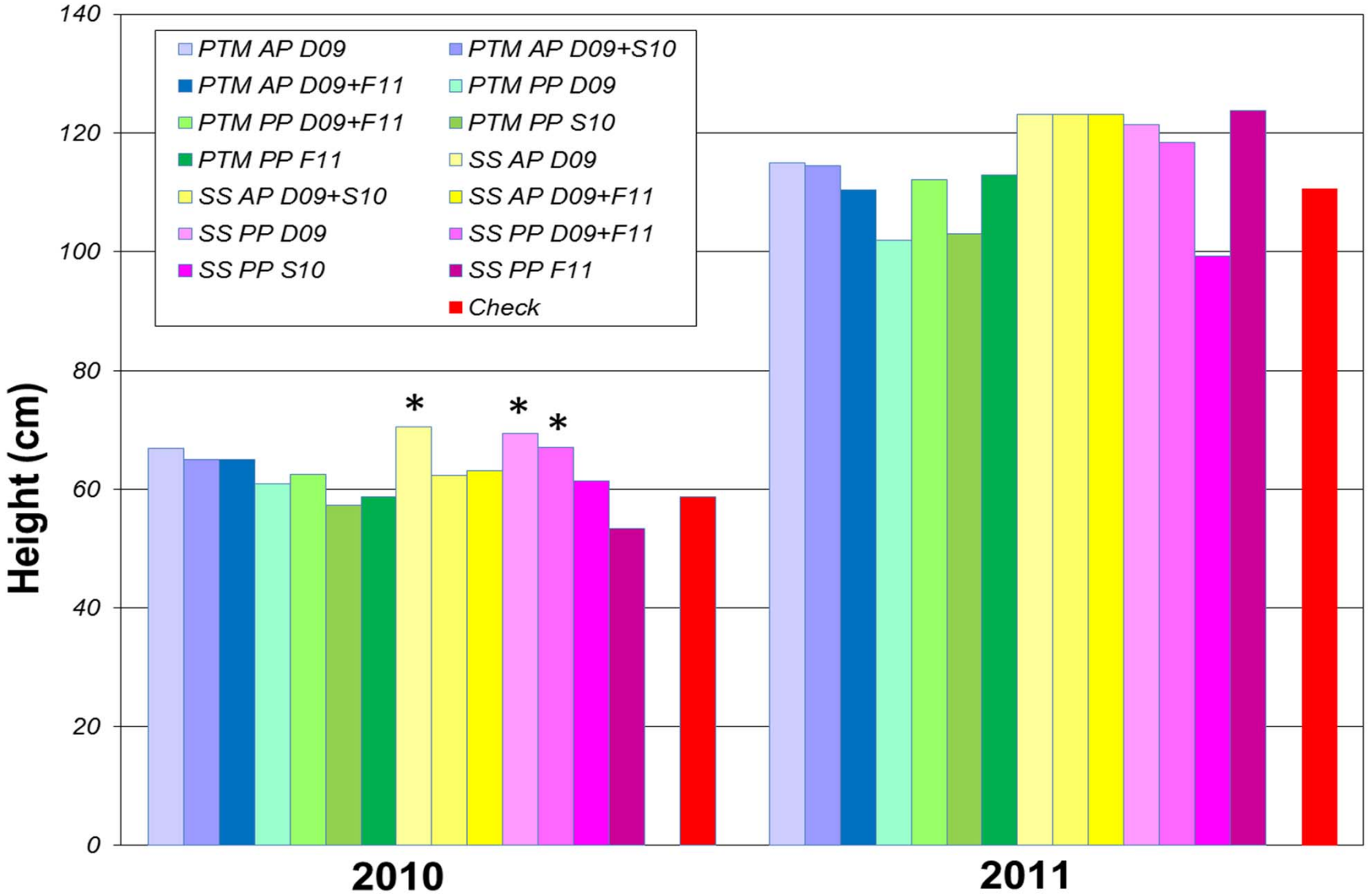
	AP	*PP*	*Dec.'09*	*Sep.'10*	*Feb.'11*
PTM	X		X		
PTM		X	X		
PTM		X		X	
PTM	X	X	X	X	
PTM		X			X
PTM	X				X
PTM		X	X		X
PTM	X		X		
SilvaShield	X		X		
SilvaShield		X	X		
SilvaShield		X		X	
SilvaShield	X	X	X	X	
SilvaShield		X			X
SilvaShield	X	X	X		X
SilvaShield		X	X		X
Check					

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



* Significantly different from untreated check

Mean height (cm) of one- and two-year old PTM™- and SilvaSheild™-treated and untreated loblolly pine: 2010 & 2011.



* *Significantly different from untreated check*

Research Efforts in 2012

Objectives:

- **Continue to monitor efficacy of SilvaShield™ tablet applied operationally against pine tip moth on several sites (2 in AR and 3 in TX).**
- **Continue to monitor effects of SilvaShield™ alone and combined with fertilizer and/or weed control.**

I hear a dinner bell.

Tip Moth Impact and Hazard-Rating

Tip Moth Impact and Hazard-Rating: 2001 - 2010

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.

Research Efforts in 2011

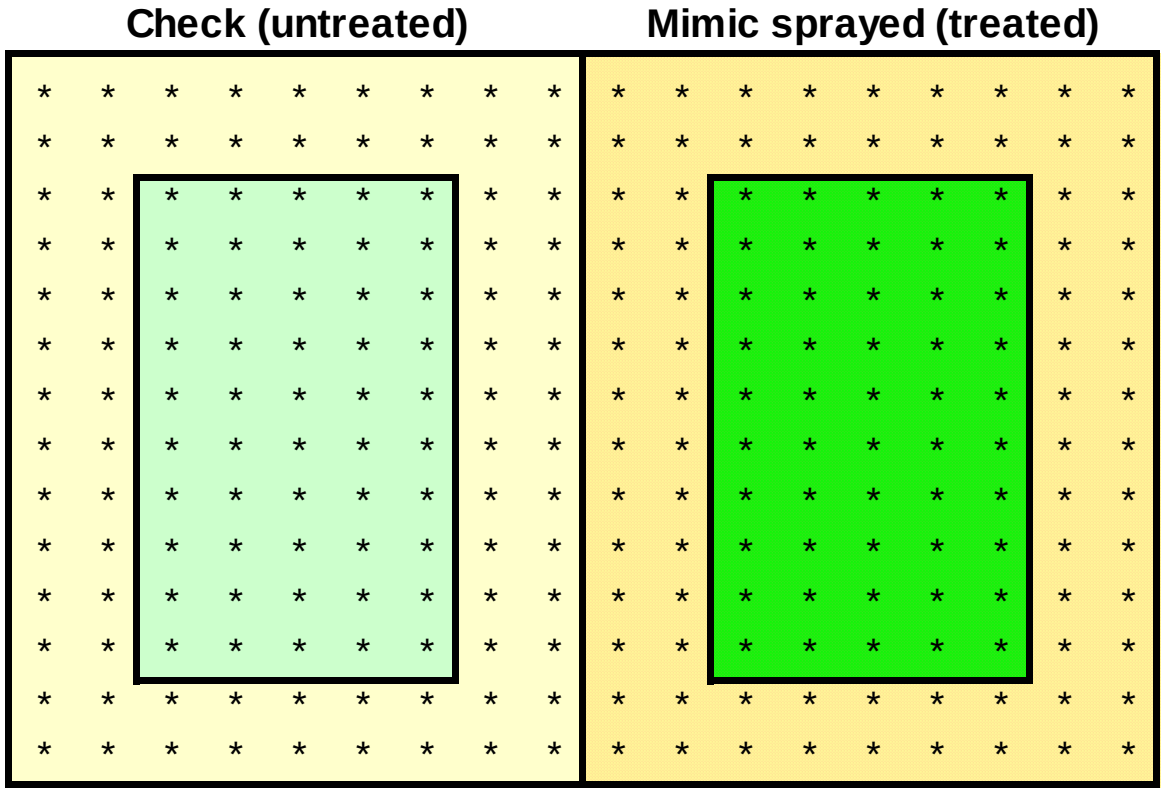
Tip Moth Impact and Hazard Rating

- 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.

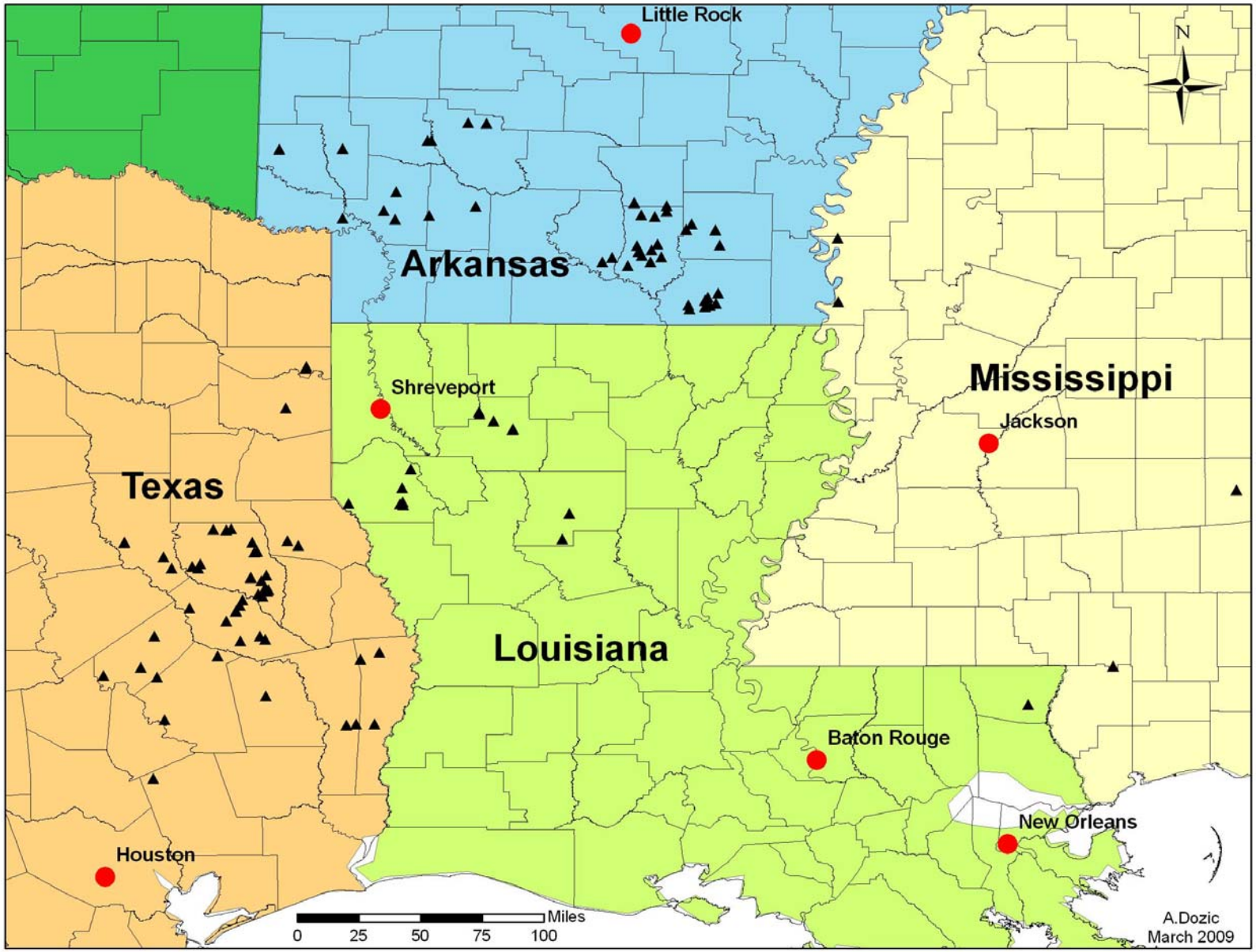
- Analysis was completed by Mr. Trevor Walker and Dr. Dean Coble, SFASU, on cost/benefit analysis and hazard-rating model development.

Layout for Impact/Hazard-Rating plots



Check plot also Hazard-rating plot

Impact Sites (110)

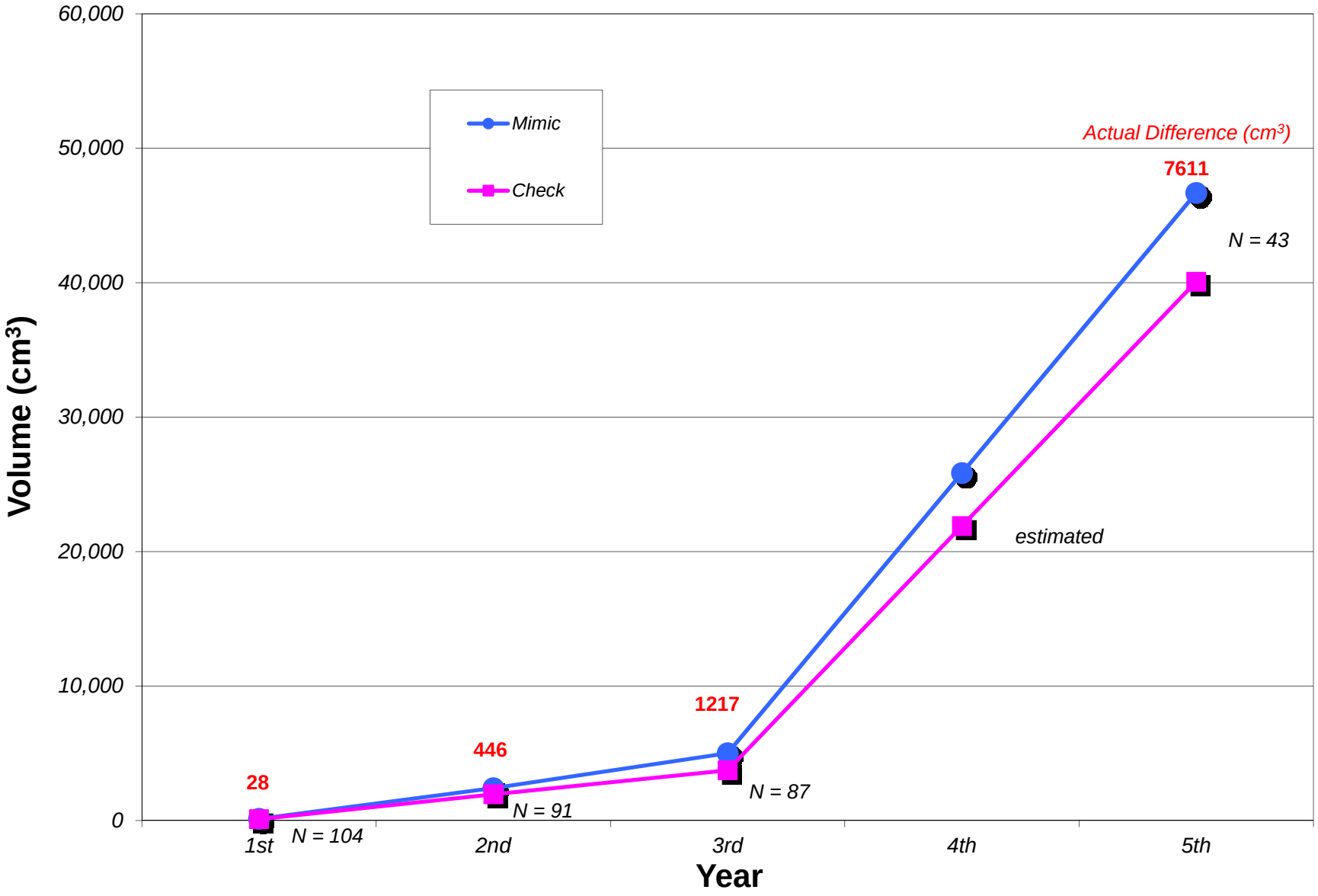


Mean tree height, diameter and volume index and percent growth gain and actual difference in growth of one-, two-, three- and five-year old loblolly pine following treatment with Mimic® after each generation in year 1 and 2; Arkansas, Lousiana, Mississippi and Texas, 2001 - 2010.

	Mean			
Treatment	Year 1 (N= 9516 trees on 104 sites)	Year 2 (N= 8560 trees on 91 sites)	Year 3 (N= 8165 trees on 87 sites)	Year 5 (N= 4104 trees on 43 sites)
	Height (cm)			
Mimic®	56.6	154	265	542
Check	51.3	141	241	514
Actual Diff. In Growth (cm)	5	14	24	28
Pct. Gain Compared to Check	**10**	**10**	**10**	**6**
	Diameter (cm)			
	at 6"	at 6"	at DBH	at DBH
Mimic®	1.15	3.18	3.32	9.04
Check	1.07	2.93	2.84	8.63
Actual Diff. In Growth (cm)	0.09	0.24	0.48	0.42
Pct. Gain Compared to Check	**8**	**8**	**17**	**5**
	Volume Index (cm^3)			
Mimic®	127	2386	4798	46084
Check	99	1940	3580	38473
Actual Diff. In Growth (cm)	28	446	1217	7611
Pct. Gain Compared to Check	**28**	**23**	**34**	**20**

Volume Index = Height X Diameter^2

Mean volume index (cm^3) of one- to five-year old Mimic®-treated and untreated loblolly pine: 2001 - 2010.



Conclusions

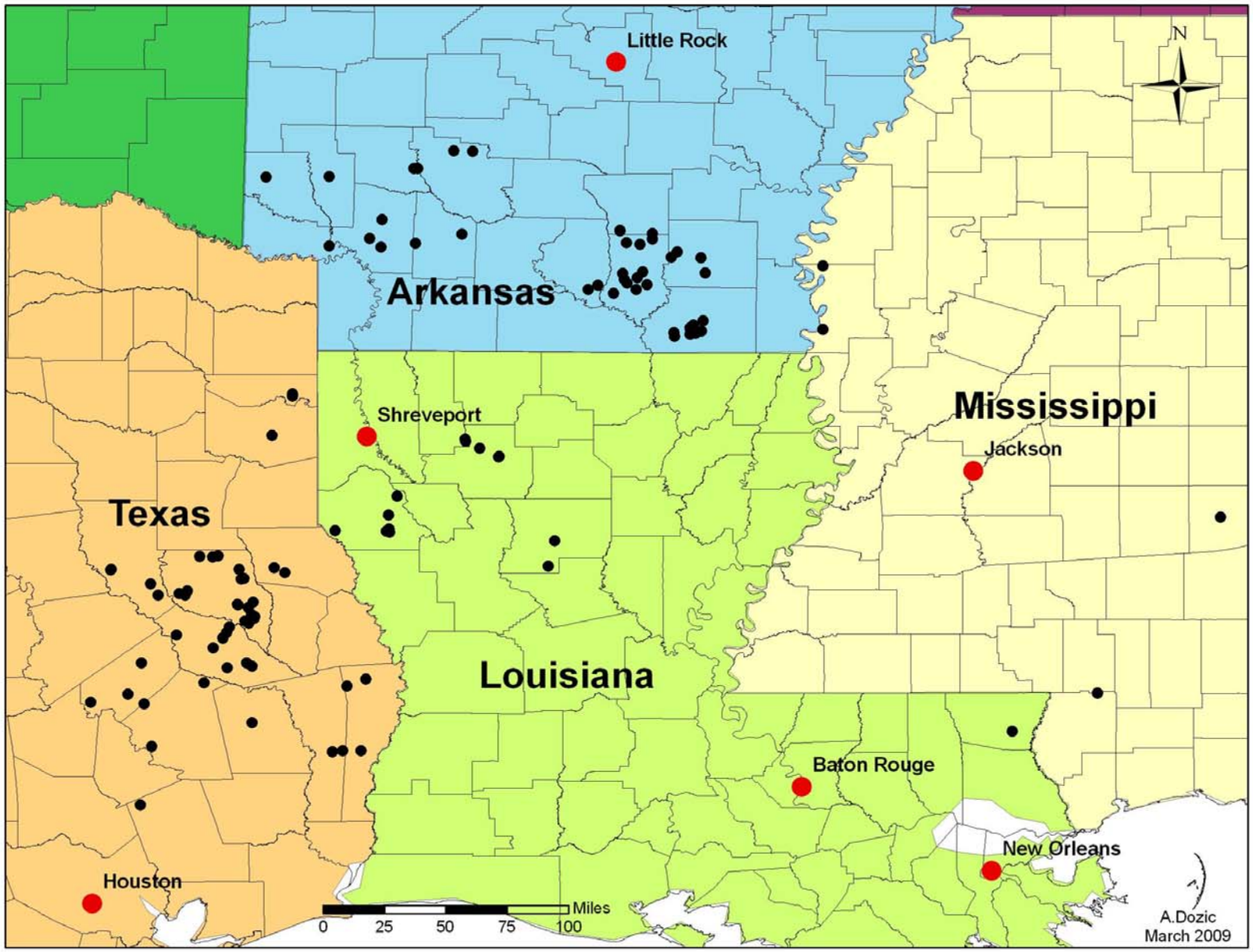
The impact of pine tip moth on tree height and diameter was greatest around age 5, after which the growth parameters of treated and check trees began to converge.

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.

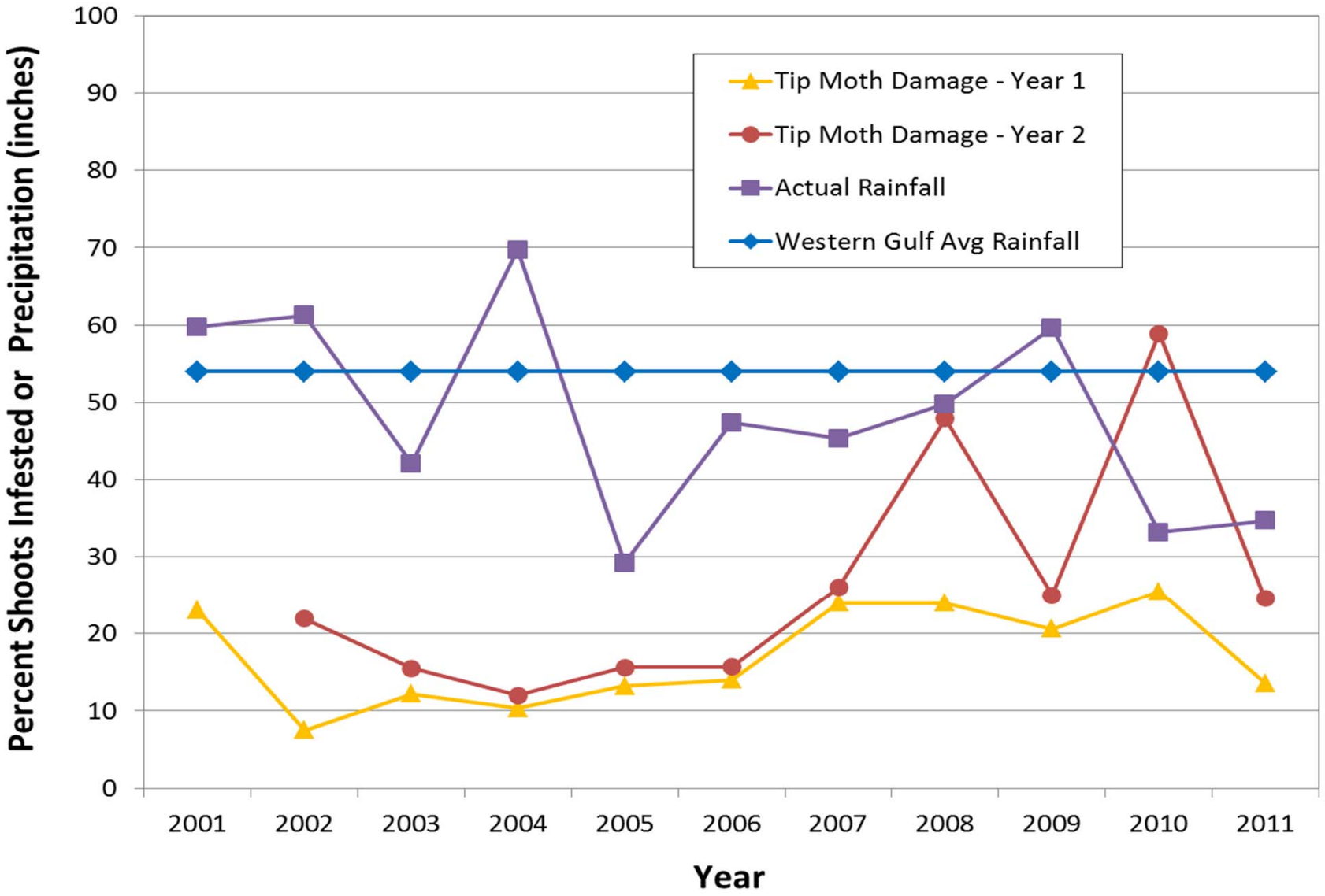
Site Characteristics

- Soil texture, drainage and nutrients
- Depth to horizons, hard-pan and gleying
- Site index
- Silvicultural prescription
- Slope, aspect, position, size
- Competing vegetation
- Rainfall
- Proximity and area of susceptible host type
- Percent tip moth infestation

Hazard Rating Sites (142)



Relationship between rainfall and tip moth damage levels in the Western Gulf Region, 2001 - 2011.



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 sent to Trevor Walker for analysis.

		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

Research Efforts 2012

- **Waiting for the outcome of data analysis by Trevor Walker and Dr. Dean Coble on hazard-rating model development.**

- **Schedule meeting with interested parties to discuss status of tip moth knowledge, identify areas of need, and if necessary coordinate future research.**

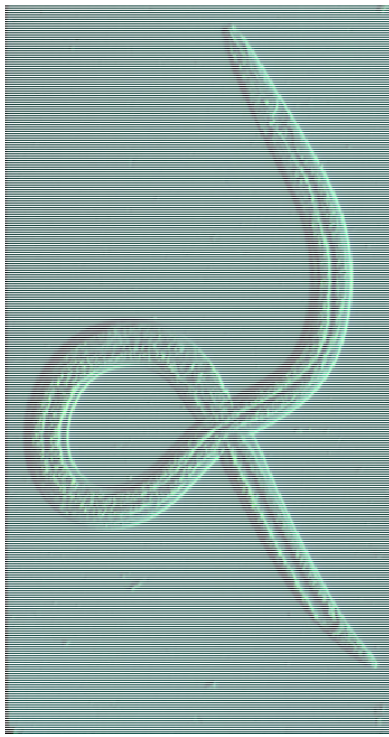
Pine Wood Nematode Study - 2012

- **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.



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:**

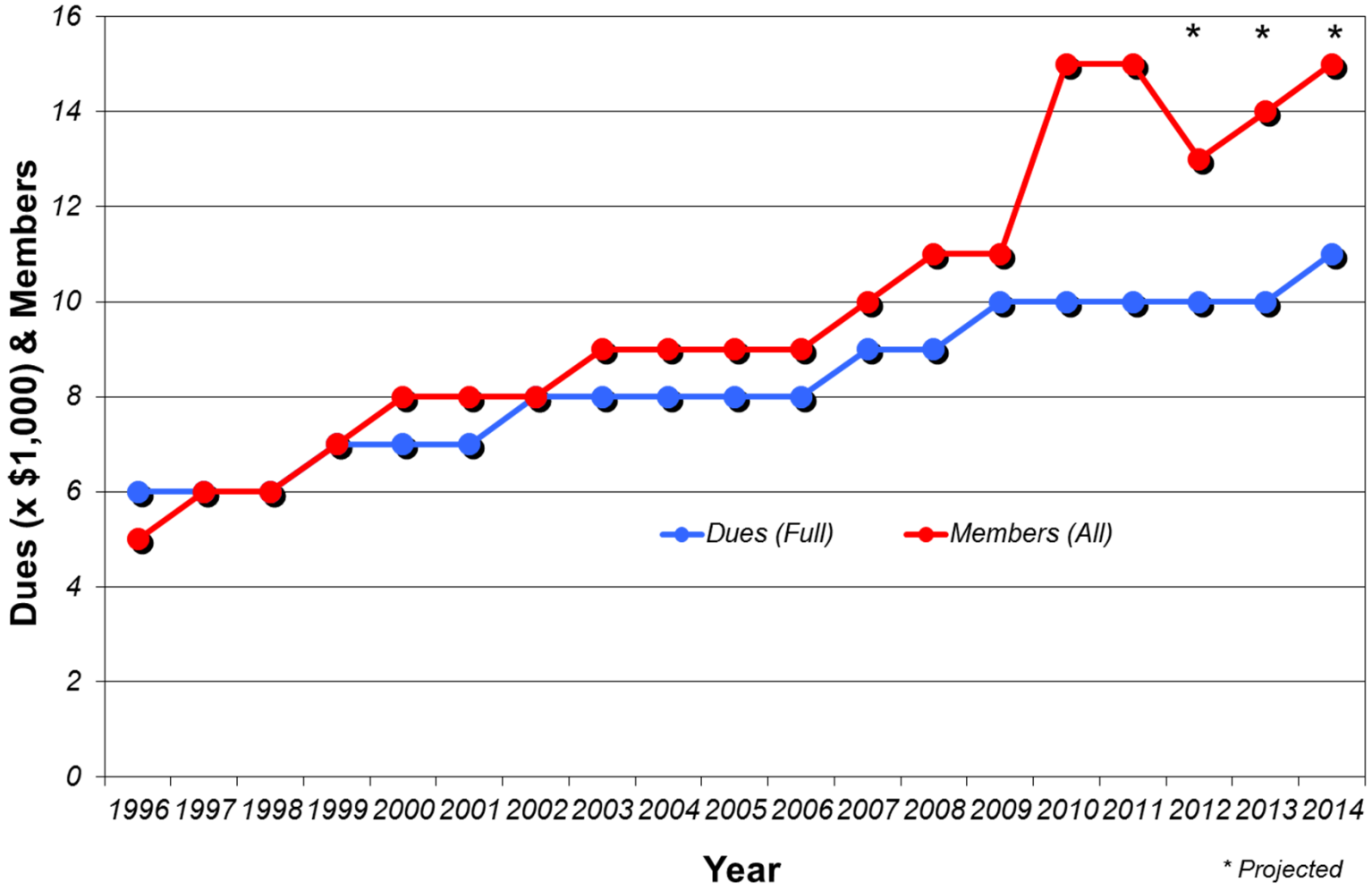
  Repellex tablets (2) applied at planting
  Repellex tablets (2) applied post plant next to seedling
  Deer Away BGR spray applied after planting
  Untreated Check

Other Issues

- **Training needs related to Tree-äge™, PTM™ (TM and LCA) and SilvaShield™? Separate or as part of Contact Meeting?**
- **FPMC Web Site (www.FPMCoop.com): offers password-protected access to proposals, reports, and newsletters. What about data?**
- **Forestry Pesticide web page**
- **Development of Container Plug Injection System**
- **New pest problems of concern?**
- **Anything else?**

Budget Matters

- 2011 Expenditures
- 2012 & 2013 Budgets



List of Funding Sources and Expenditures by Calendar Year

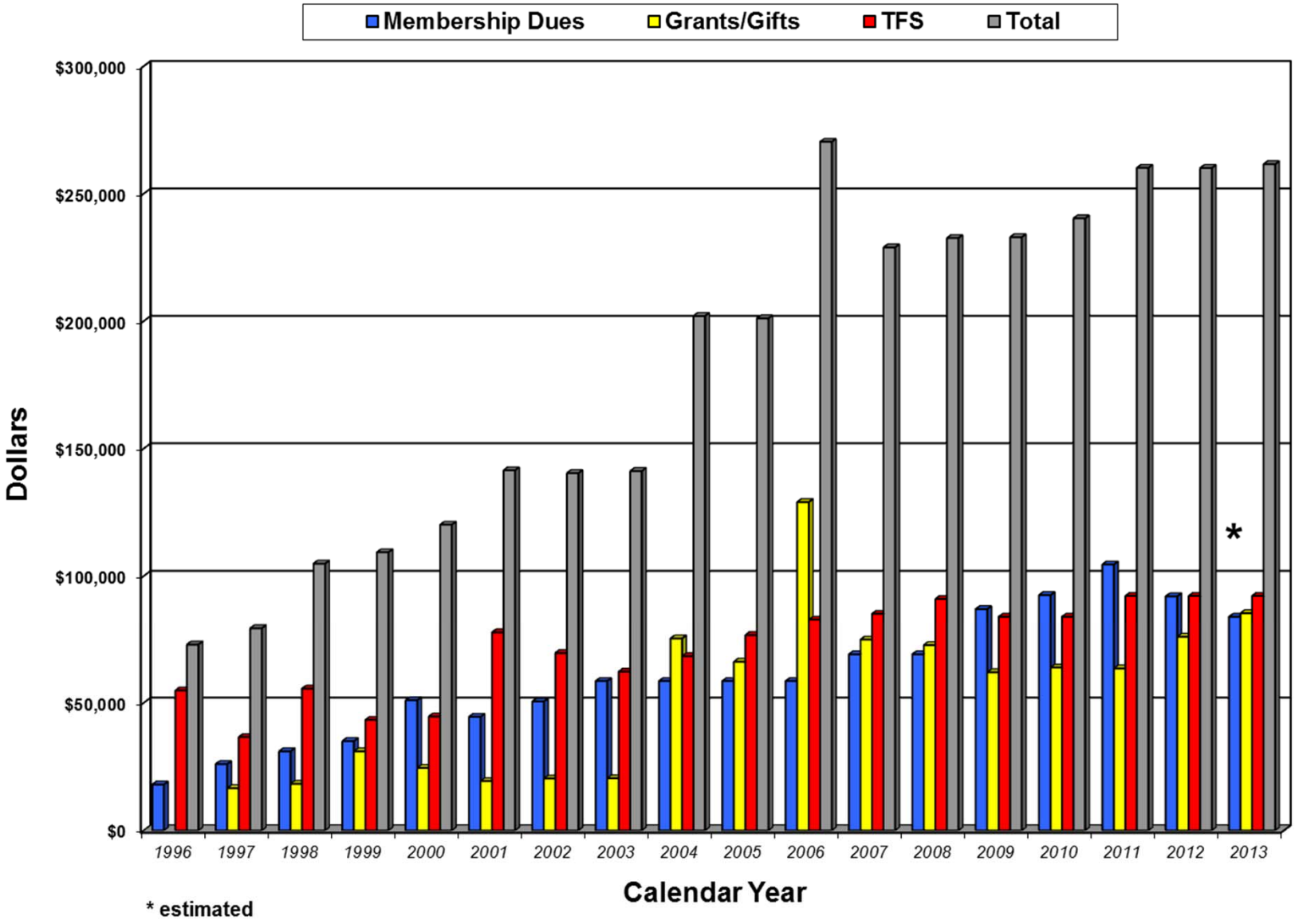
Year	No. Full / Assoc. Members **	Membership Dues: Full / Assoc. / Year	Total Revenue	Grants/Gifts	TFS	Total	Dues % of Total	TFS % of Total	
1996	3 / 1	$6K / ----	$18,000		$54,800	$72,800	25%	75%	
1997	4 / 1	$6K / $2K	$26,000	$16,600	$36,571	$79,171	33%	46%	
1998	5 / 0	$6K / $2K	$31,000	$18,300	$55,560	$104,860	30%	53%	
1999	5 / 0	$7K / $2.5K	$35,000	$31,000	$43,285	$109,285	32%	40%	
2000	7 / 1	$7K / $2.5K	$51,000	$24,488	$44,621	$120,109	42%	37%	***
2001	6 / 1	$7K / $2.5K	$44,500	$19,356	$77,600	$141,456	31%	55%	
2002	6 / 1	$8K / $2.5K	$50,500	$20,356	$69,512	$140,368	36%	50%	
2003	7 / 1	$8K / $2.5K	$58,500	$20,468	$62,206	$141,174	41%	44%	
2004	7 / 1	$8K / $2.5K	$58,500	$75,195	$68,301	$201,996	29%	34%	
2005	7 / 1	$8K / $2.5K	$58,500	$66,054	$76,517	$201,071	29%	38%	
2006	7 / 1	$8K / $2.5K	$58,500	$129,000	$82,847	$270,347	22%	31%	
2007	7 / 2	$9K / $3K	$69,000	$74,755	$85,156	$228,911	30%	37%	
2008	8 / 2	$9K / $3K	$79,000	$67,000	$86,553	$232,553	34%	37%	
2009	8 / 2	$10K / $3.5K	$87,000	$61,960	$84,000	$232,960	37%	36%	***
2010	8 / 5	$10K / $3.5K	$92,500	$63,818	$84,000	$240,318	38%	35%	***
2011	7 / 5	$10K / $3.5K	$104,500	$63,463	$92,159	$260,122	40%	35%	***
2012 *	7 /4 *	$10K / $3.5K	$92,000	$75,894	$92,159	$260,053	35%	35%	
2013 *	7 /4 *	$10K / $3.5K	$84,000	$85,394	$92,159	$261,553	32%	35%	
Mean			$61,000	$53,712	$71,556	$183,284	32%	44%	

* estimated

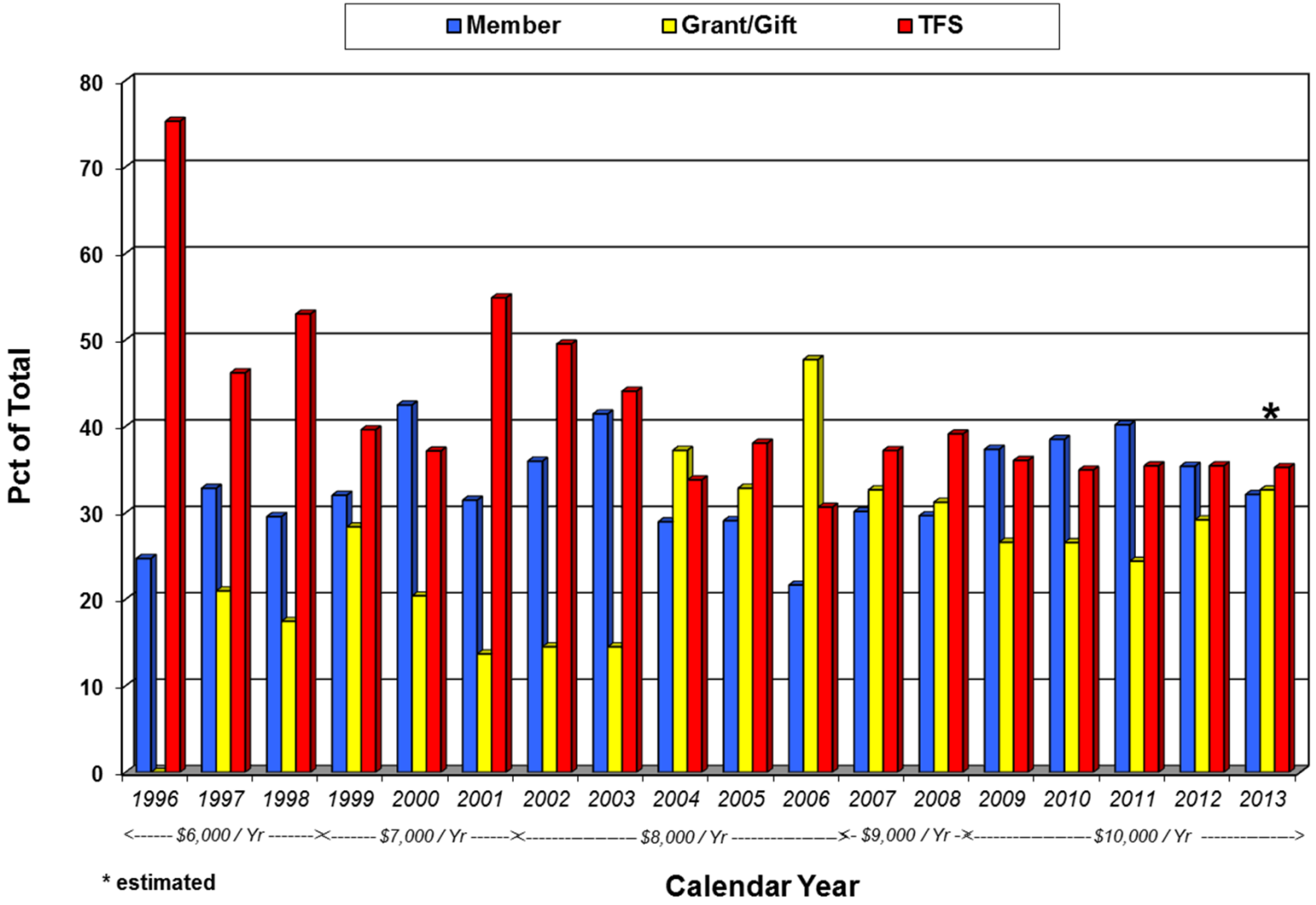
** Not including TFS

*** Years TFS not paying more than members.

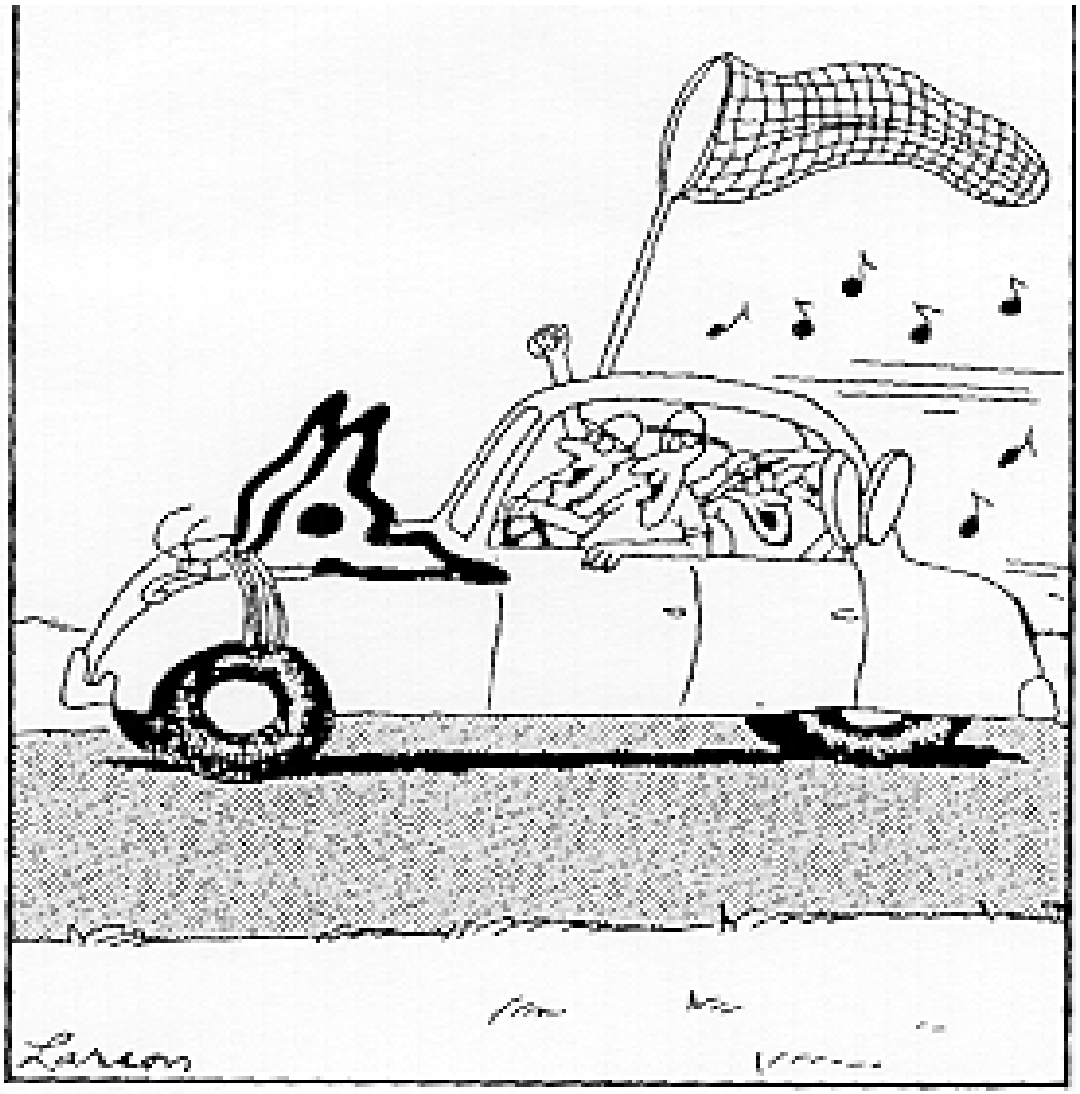
FPMC Budget by Source



FPMC Dues, Grants/Gifts, and TFS as Percent of Total Expenditures



I hear a dinner bell.



Thank you again for your support!!

THE END

Scott Nelson / Getty Images