

# Research Results from Long Term Studies of Winter Sanitation of Pistachios

**Brad Higbee**

[bradh@paramountfarming.com](mailto:bradh@paramountfarming.com)

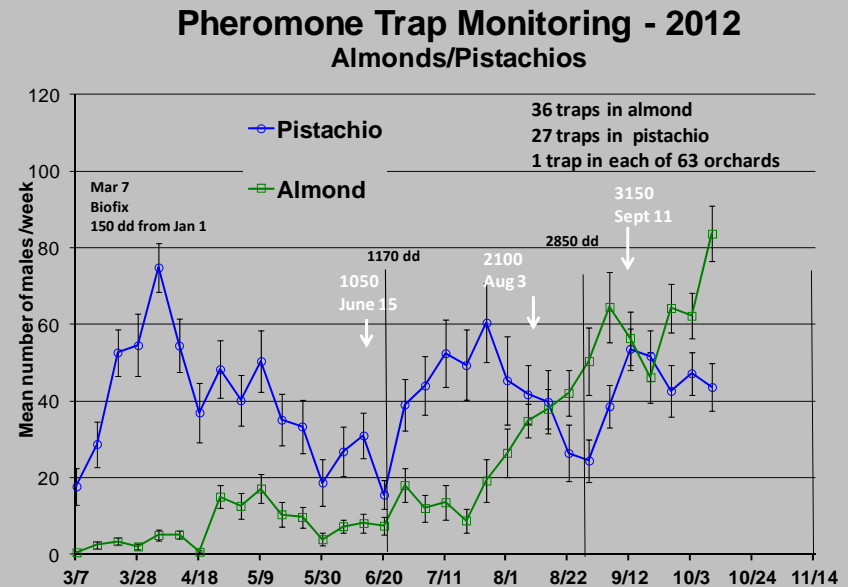
Paramount Farming Co.

Bakersfield, CA, 93306



# Pistachio Sanitation: The situation

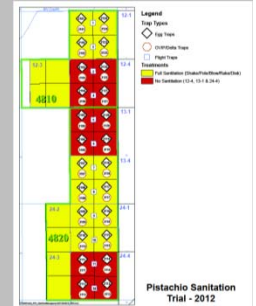
- Current pistachio sanitation efforts (on the ground) fall short of what is accomplished in almonds (5-10 vs 100's of mummies/tree)
- The consequence: Much higher NOW pops most of the season relative to almonds, greater risk of damage from NOW.



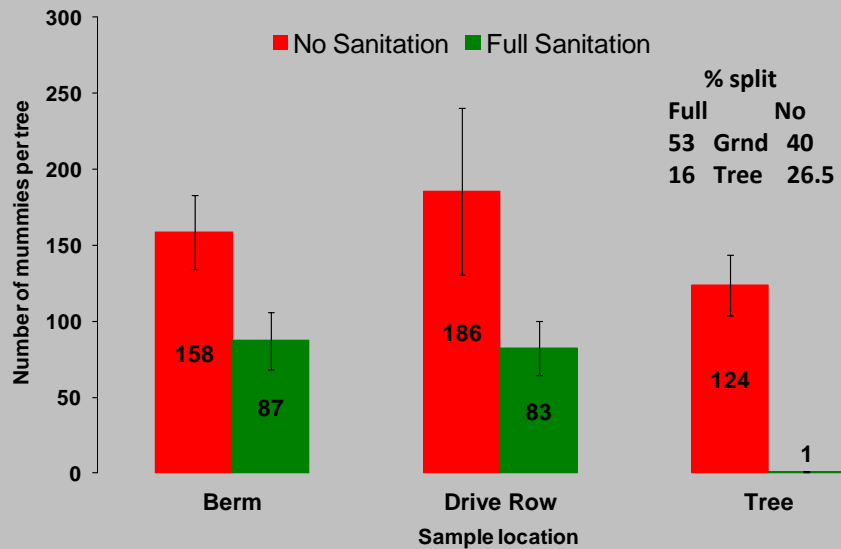
# Impact of Conventional Sanitation

## Blowing, Disking twice

- Number of mummies on berm and drive row are similar – ca 50% reduction
- Level of infestation lower in sanitized plots
- Over 20x NOW pops in unsanitized plots
- But little difference in female baited traps – saturation or dispersal
- Egg traps often reflect mummy load - competition

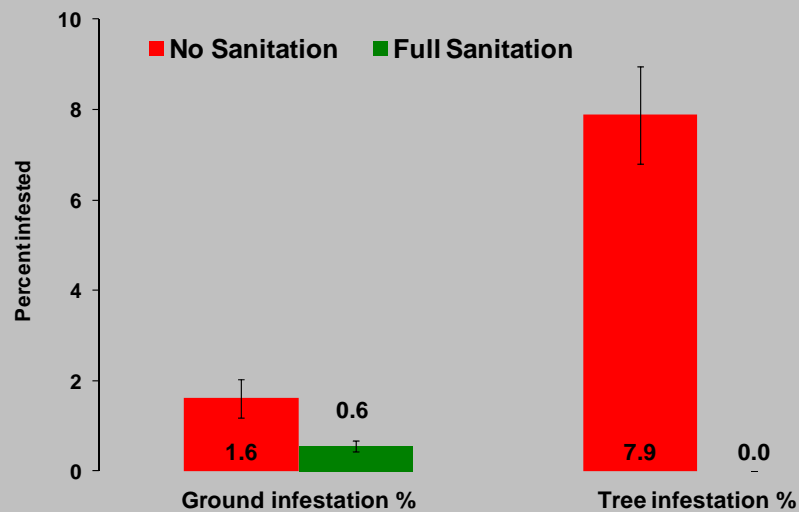


## Pistachio Sanitation Trial - 2012 Mummy Assessments - Feb/Mar



Infested mummies/tree		
	Full	No San
Grnd	0.53	2.52
Tree	0.00	9.75
<b>Total</b>	<b>0.5</b>	<b>12.3</b>

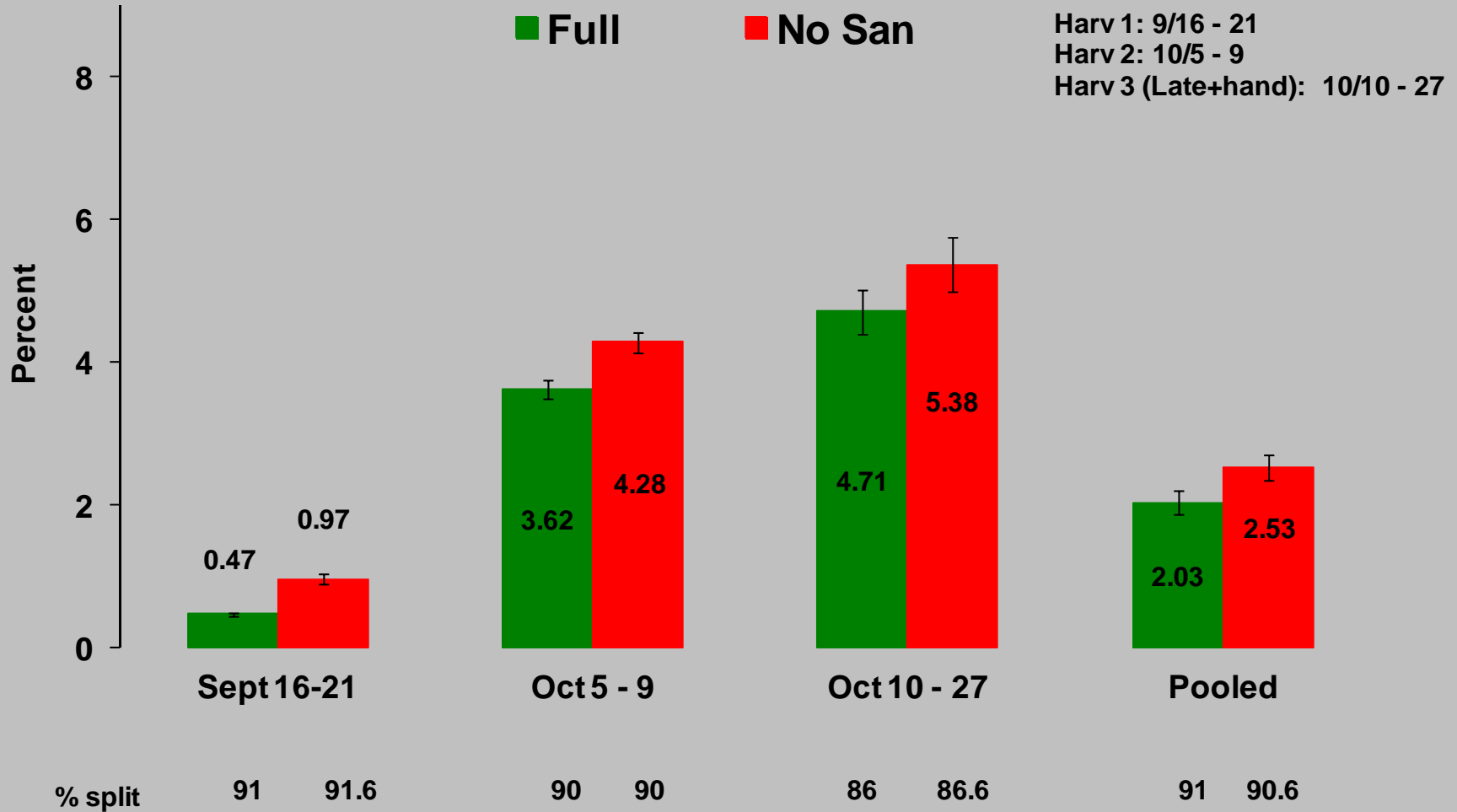
## Pistachio Sanitation Trial - 2012 Percent of mummies infested



For 150 trees/ac:  
Full San= 75/ac  
No San= 1845/ac  
Over 20x increase

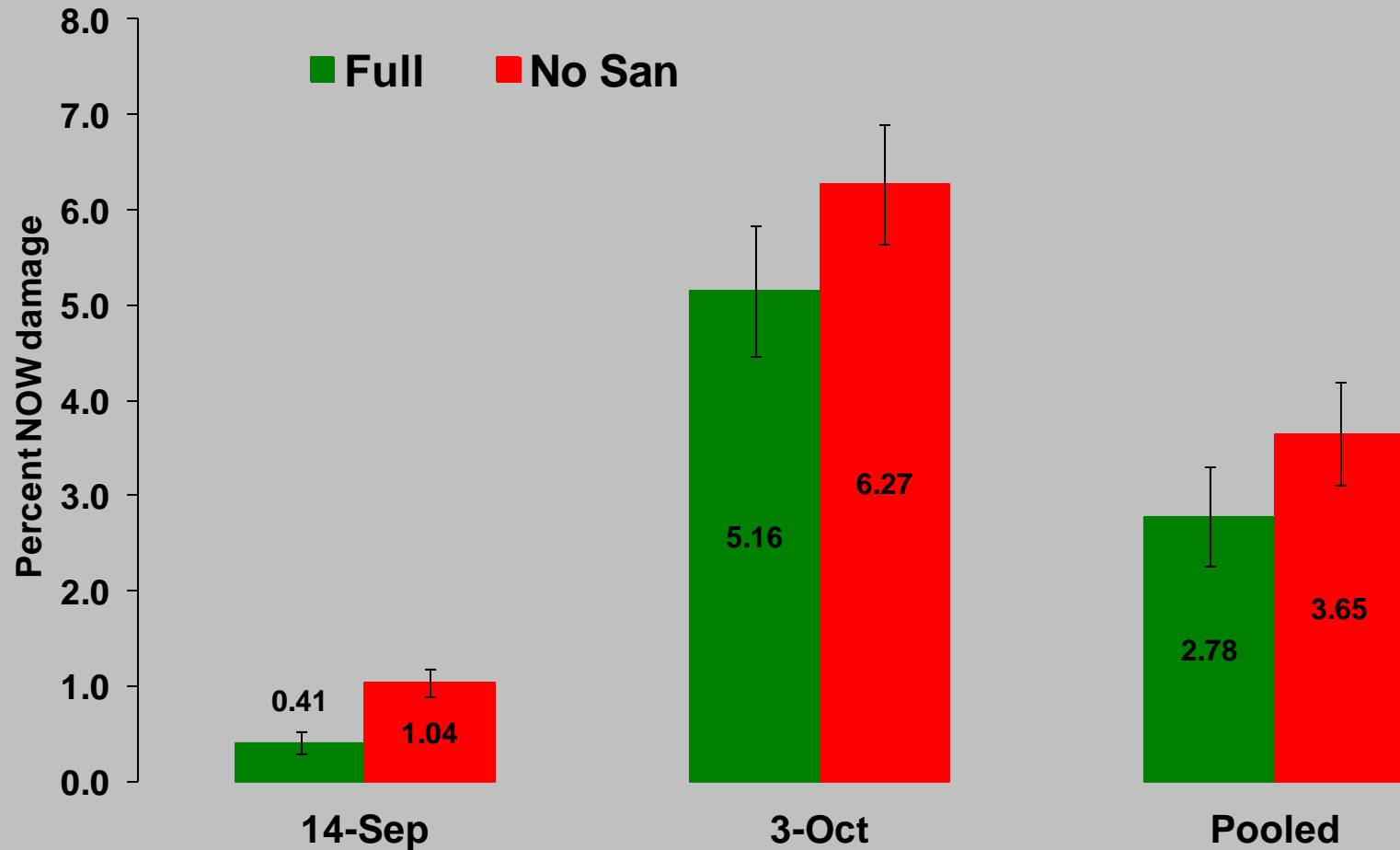
# Pistachio Sanitation Trial - 2012

## Processor Insect Damage

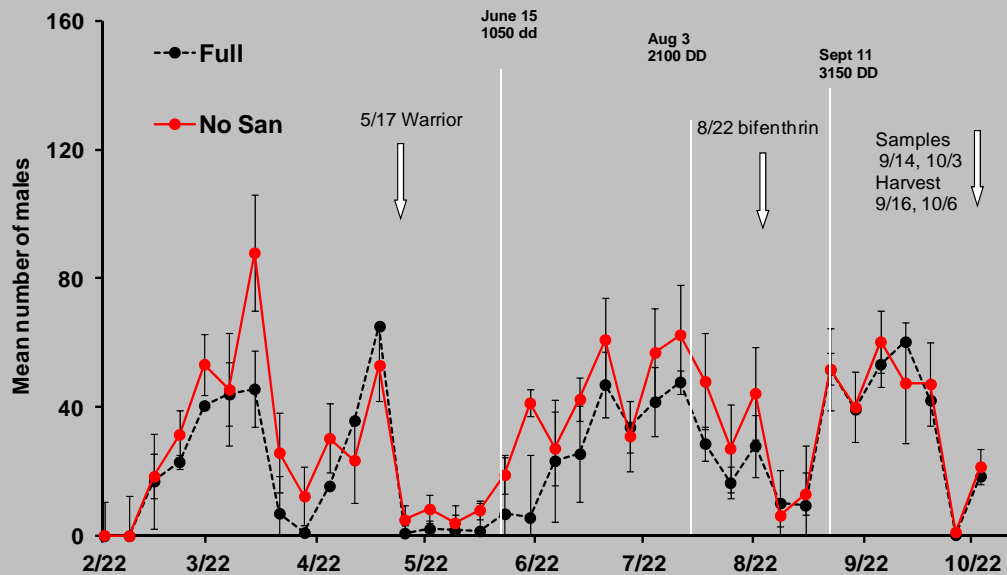


# Pistachio Sanitation Trial - 2012

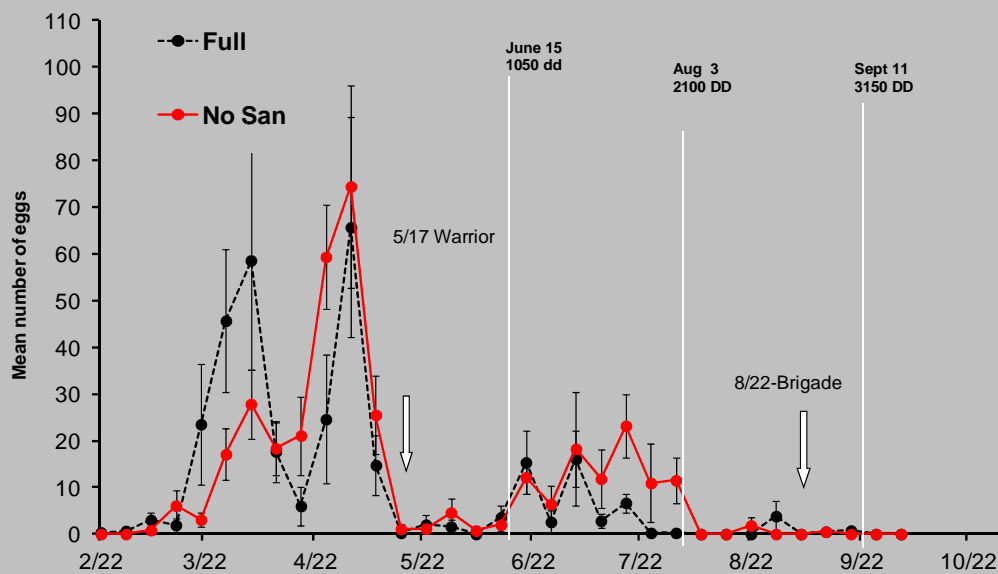
## Harvest Damage Assessments - Exp Samps



## Pistachio Sanitation Trial - 2012 NOW Pheromone Traps



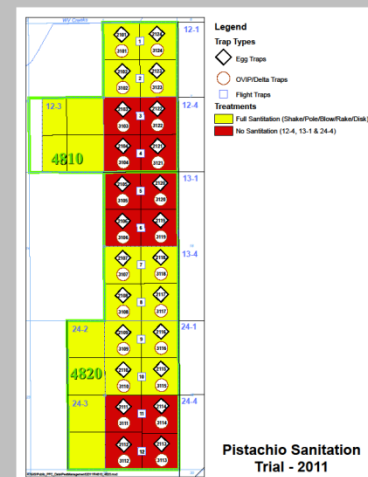
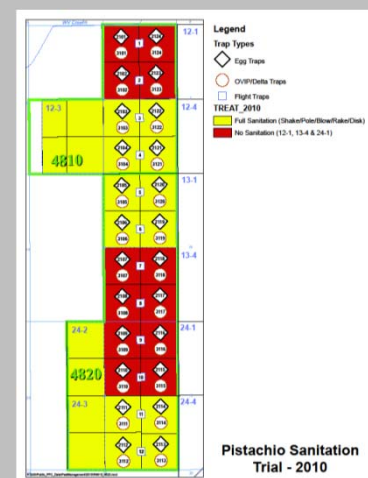
## Pistachio Sanitation Trial - 2012 NOW Egg Traps



# Long-Term Sanitation Study

Although not able to achieve mummy levels found in almonds, reduction in damage has been consistent.

Yr	Ground Mummies		% NOW Dmg		* sig diff
	Mean/tree		mean %		
	No San	Full	No San	Full	
2005	249	25	2.4	1.73	0.67 *
2006	829	147	0.25	0.07	0.18 *
2007	601	142	5.1	3.5	1.6 *
2008	932	335	1.43	0.86	0.57 *
2009	1731	537	1.67	1.54	0.13
2010	729	459	0.44	0.25	0.19 *
2011	763	239	0.42	0.11	0.31 *
2012	344	170	3.66	2.80	0.86 *



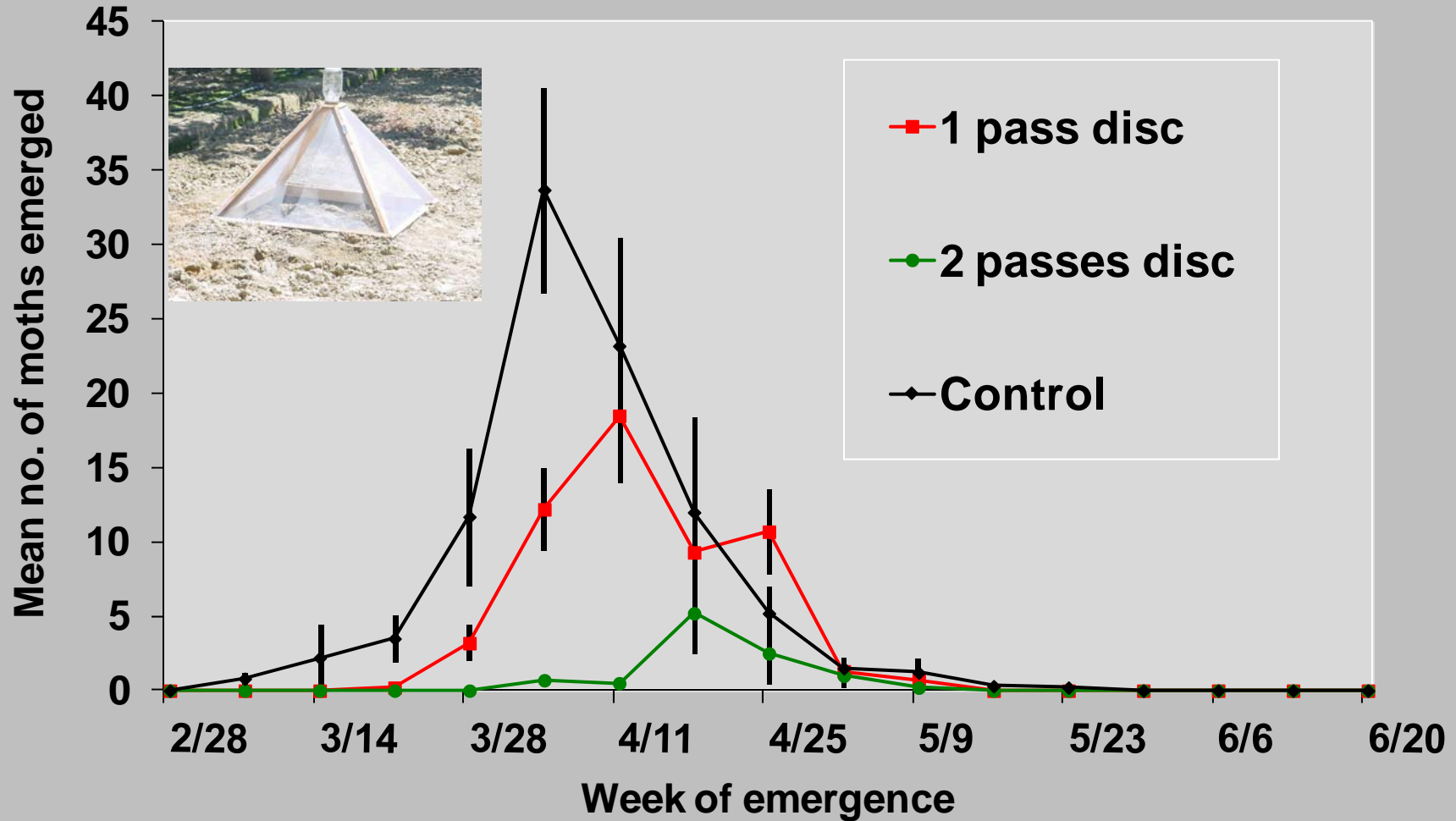
# Pistachio Mummy Destruction: Disking or Mowing?

- Lab and field studies
- Orchards under disking must be converted
- A level orchard floor would open possibilities for additional sanitation techniques

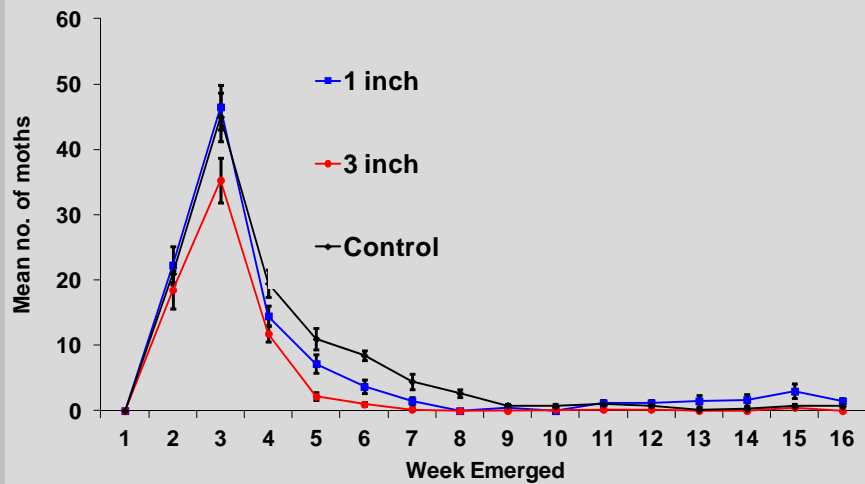


# NOW Field Emergence - 2002

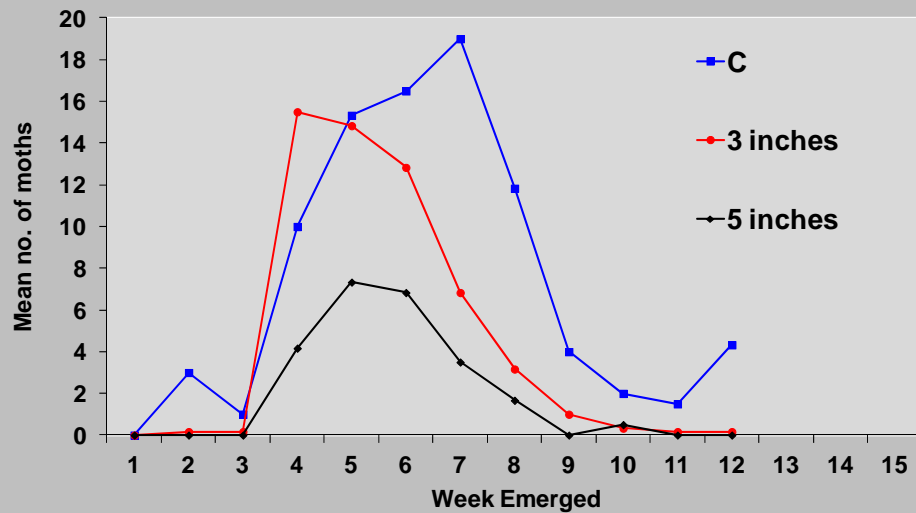
## Effect of Disking



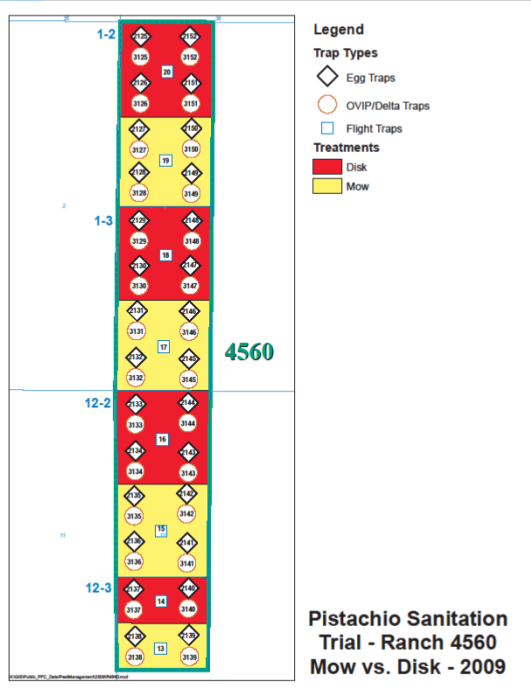
### Almond Mummies Buried under Soil - 2002 Lab Study



### Almond Mummies Buried under Soil - 2003 Lab Study



# Comparing disking vs mowing/shredding



Yr	Ground Mummies		% NOW Dmg	
	Disk	Mow	Disk	Mow
2006	161	179	0.4	0.43
2007	62	123	4.9	4.2
2008	142	52	1.3	0.8
2009	102	304	0.04	0.02
<b>Mean</b>	<b>117</b>	<b>165</b>	<b>1.66</b>	<b>1.36</b>
	Disk	Mow	Disk	Mow

## Can we make a pistachio orchard look like an almond orchard in terms of NOW pops?

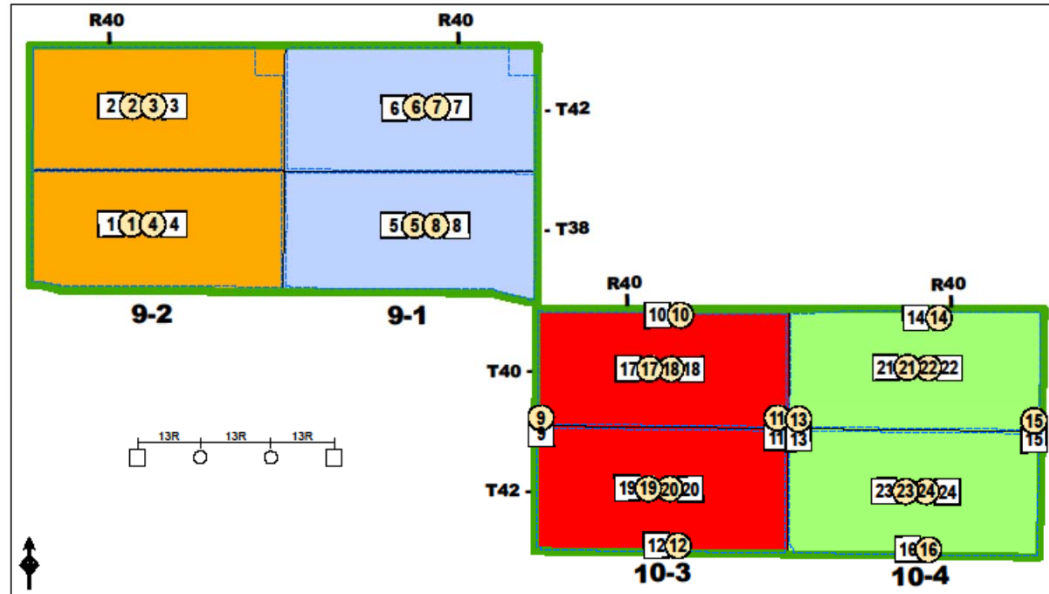
- ~~Pistachio damage has been low – why bother?~~
- If successful, sanitation in pistachio could allow successful NOW MD and...
- Would likely result in reductions in insecticide applications for NOW
- If a monitoring system for nut susceptibility can be developed, Whether MD is used or not, it is likely that insecticide use could be reduced.

## Improved Pistachio Sanitation/NOW MD Study

- Typical Almond ground mummies: 5-10/tree, Pistachios: 100's/tree
- 2 Problems:
  1. moving mummies off berm – blowing inadequate – Sweeping looks good
  2. destruction in drive row – disking and mowing not totally effective



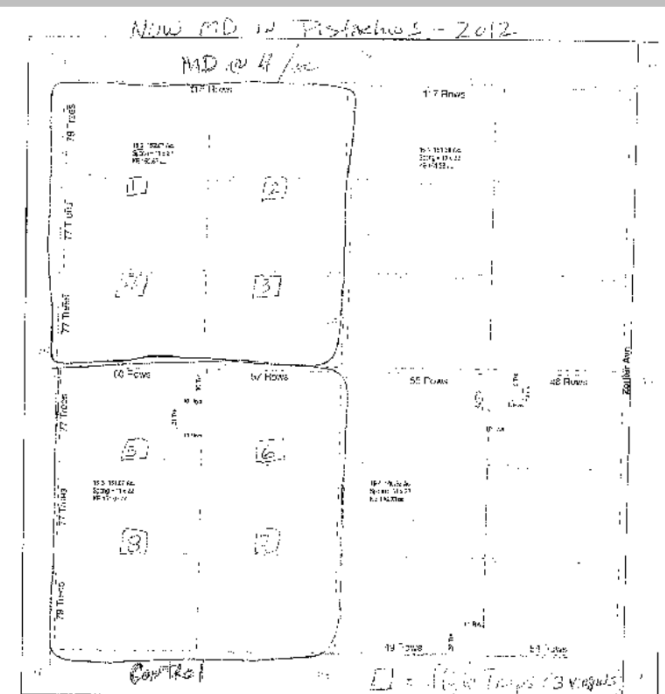
2012 MD in Pistachios -  
4 puffers/ac  
Beginning of enhanced sanitation



**Ranch 4800**  
2012 - Pistachio Ground Mummy Treatment

- Egg Traps
- Phormone Traps
- Standard Sanitation
- New Sanitation
- Control + New Sanitation
- NOW MD + New Sanitation

K:\GIS\Public\_PFC\_Data\FedManagement\2012\4800\_Ground\_Mummy.mxd



Locality Map

Var. Net Ac. (Tree ac)  
KE = 802.05 (13.59%)  
800.00 acres (on 100,000 lbs)

PERMISE GPR\_PFC\_TAXCH\_WAY\_ACTI  
\*Sp = Fan Jet D/p  
\*Wsp = Lufs  
\*Sp = 22 x 11  
\*Sick = 0.06

PERMISE ATF\_BANGLV  
\*Wsp = 1870

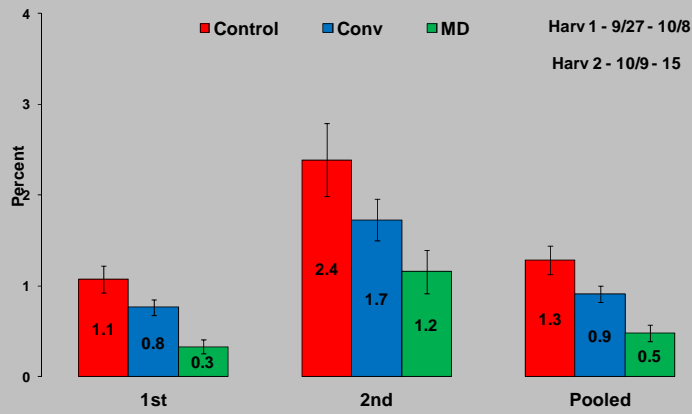
PROG 77cc\_Panling\_Hc  
\*Sick = 11 x 22  
\*Sick = 0.04

**Ranch 4260**  
**(Eastside)**

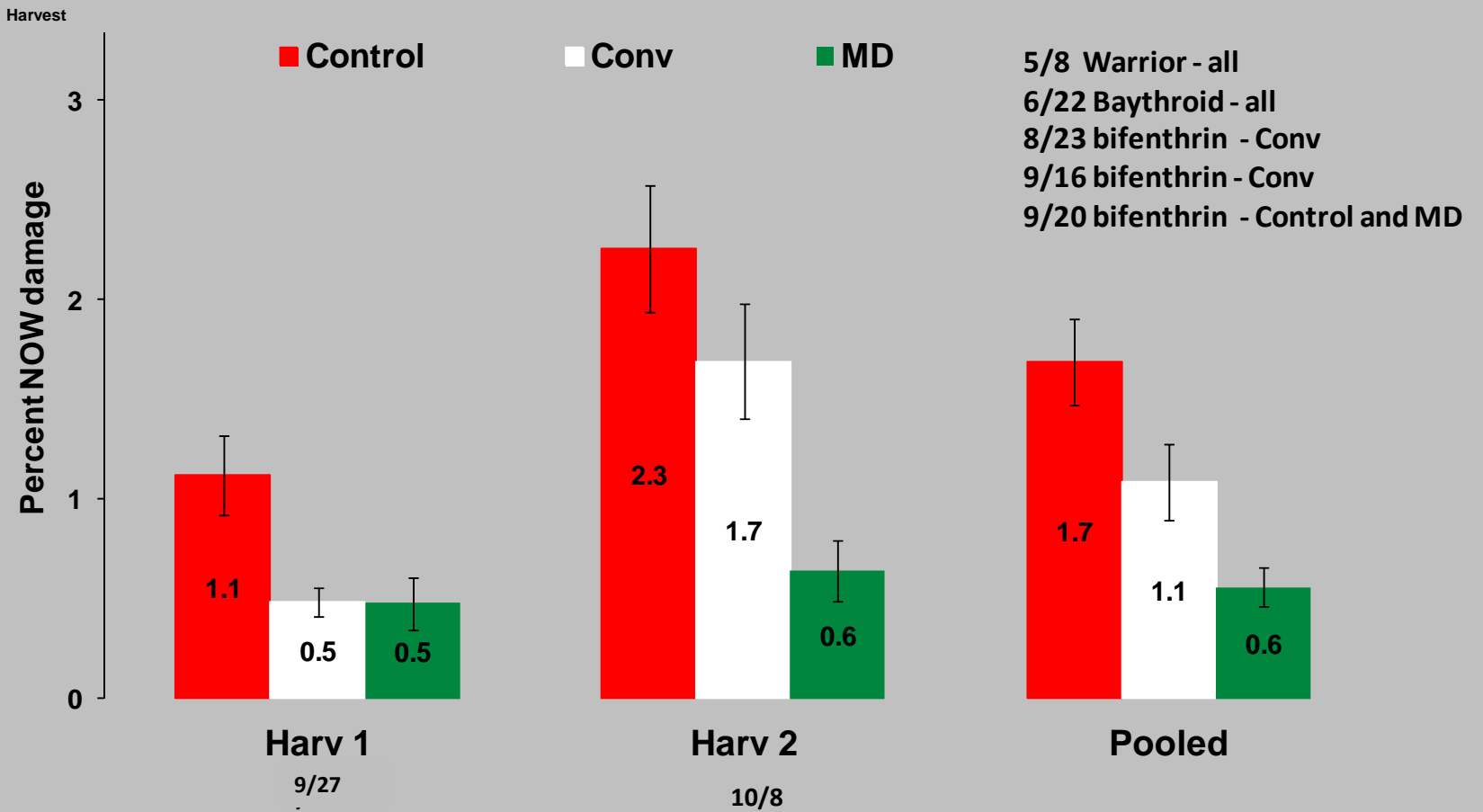
PARAMOUNT  
FARMING COMPANY

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31 of

**Pistachio NOW MD Trial - 2012**  
**R426 Standard Sanitation - PFI Insect Damage**

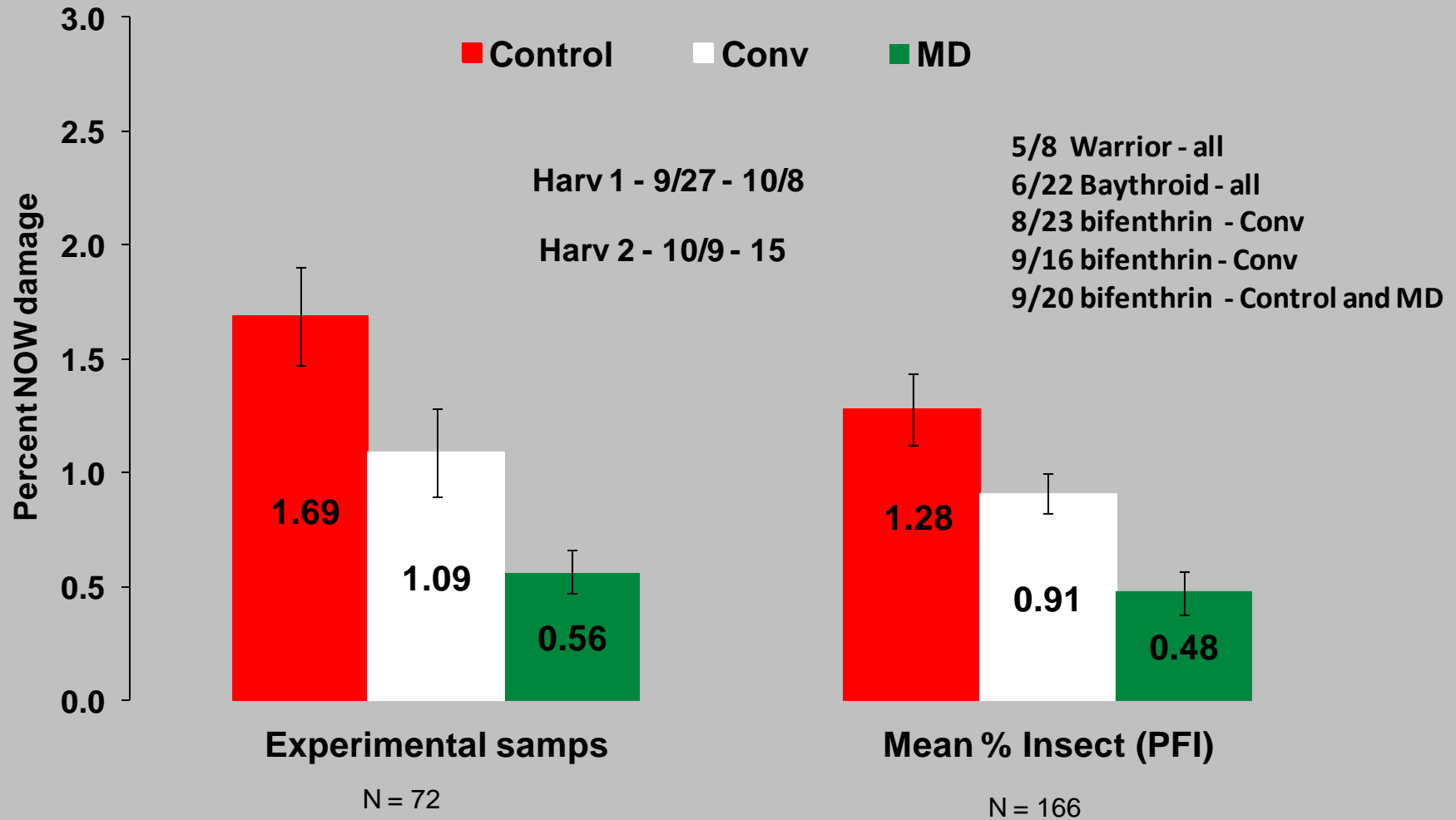


**achio NOW MD Trial - 2012**  
**Invest Damage Assessments - Exp Samps**



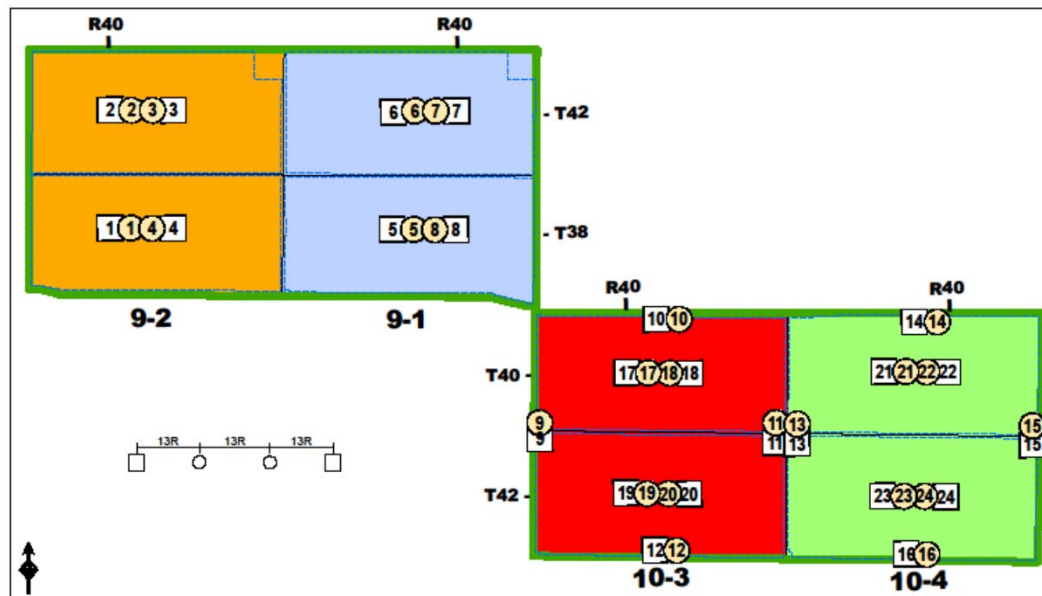
# Pistachio NOW MD Trial - 2012

## R4260 Pooled Harvest Damage Assessments



## Proposed New Approach:

1. Prepare ground if necessary, leveling, etc
  2. Shake then Sweep
  3. **A.** Use alm conditioner to pick up and grind mummies (grinder added to existing conditioner)
- or
- B.** Use conditioner/Alm harvester to pick up and move mummies outside of orchard for grinding
- or **C.** Shred – Sweep – Shred – mow x2



**Ranch 4800**  
2012 - Pistachio Ground Mummy Treatment

- Egg Traps
- Pheromone Traps
- Standard Sanitation
- New Sanitation
- Control + New Sanitation
- NOW MD + New Sanitation

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After disking



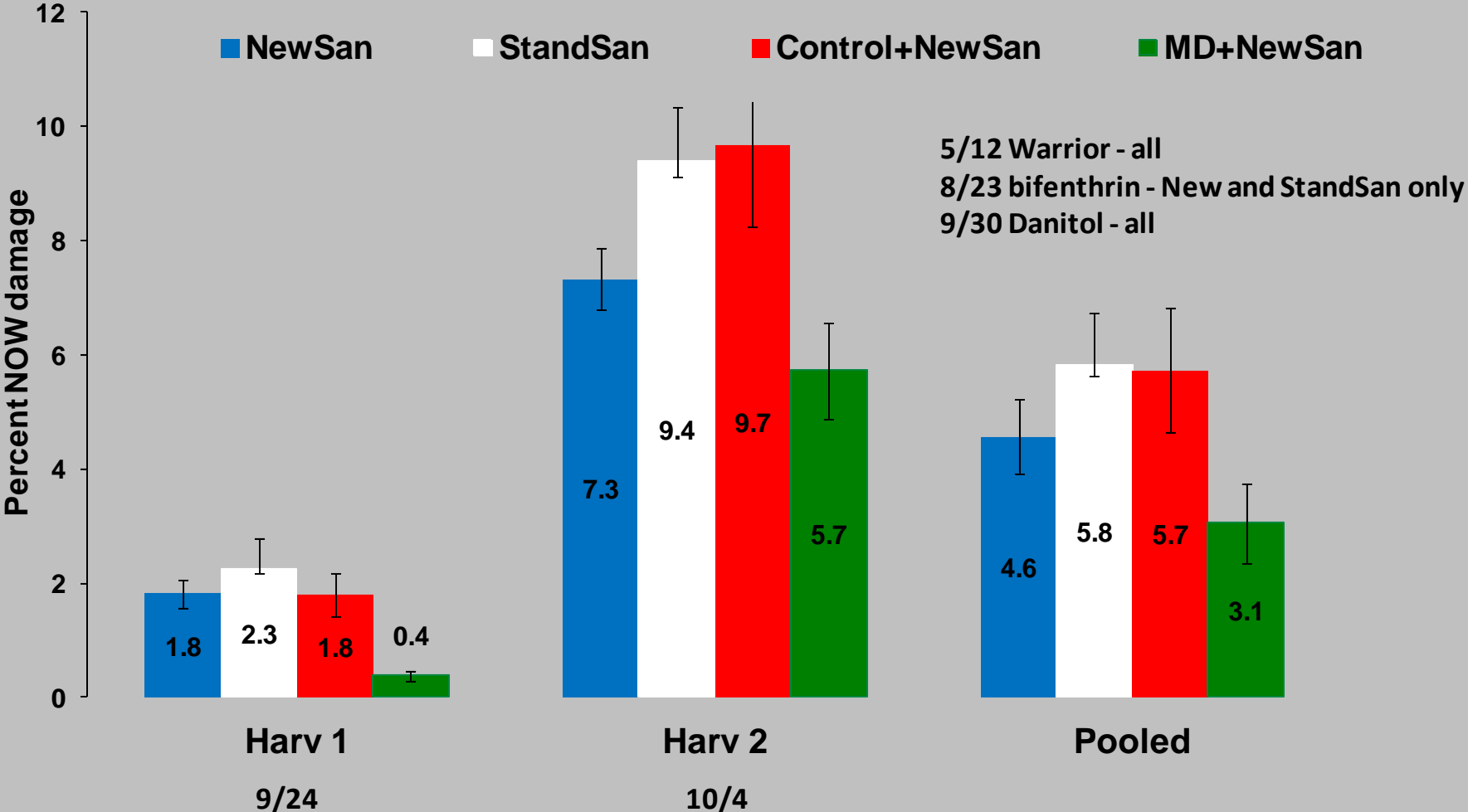
After disking followed  
by leveling

# Mummy Counts 2012– R480

	Post Sampled on 4/20-27				
<b>Post</b>	Berm/tree	Drive Row/	TotMums/tree		
Treatment	Mean	Mean	Mean		
MD	29	76	105	Shake, blow, diskx2 +schmizer	
NewSan	40	89	129	Shake, blow, diskx2 +schmizer	
OldSan	62	91	153	Shake, blow, diskx2	

# Pistachio Sanitation-NOW MD Trial - 2012

## R4800 Harvest Damage Assessments - Exp Samps

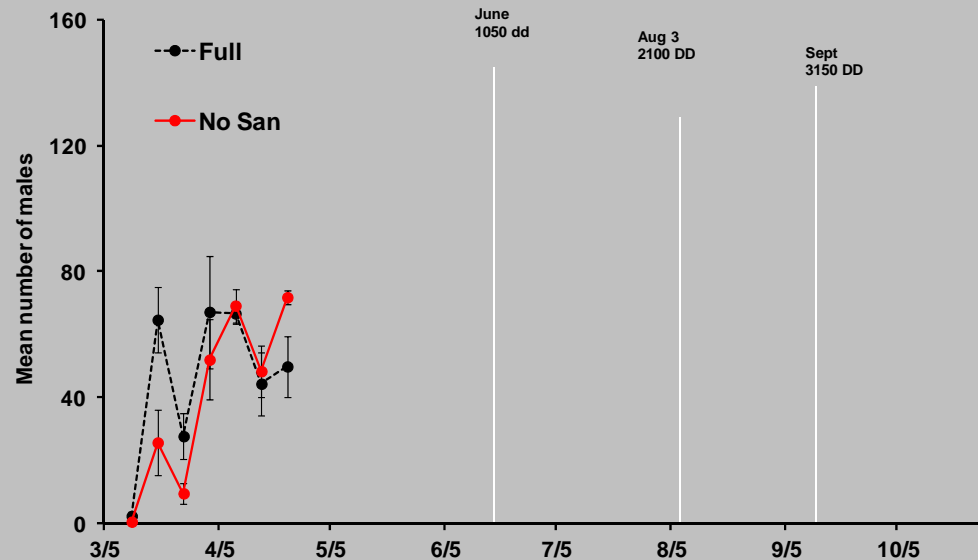




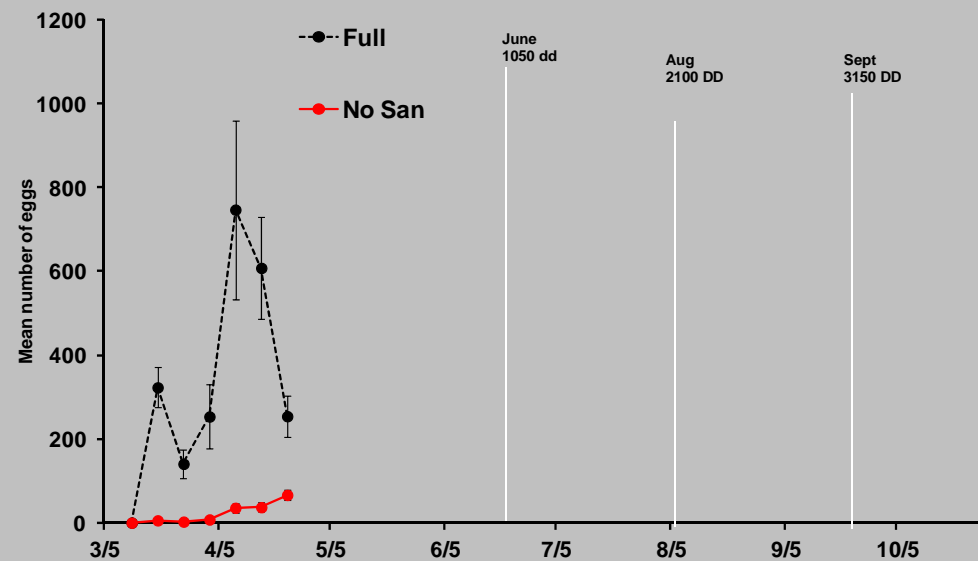
2013



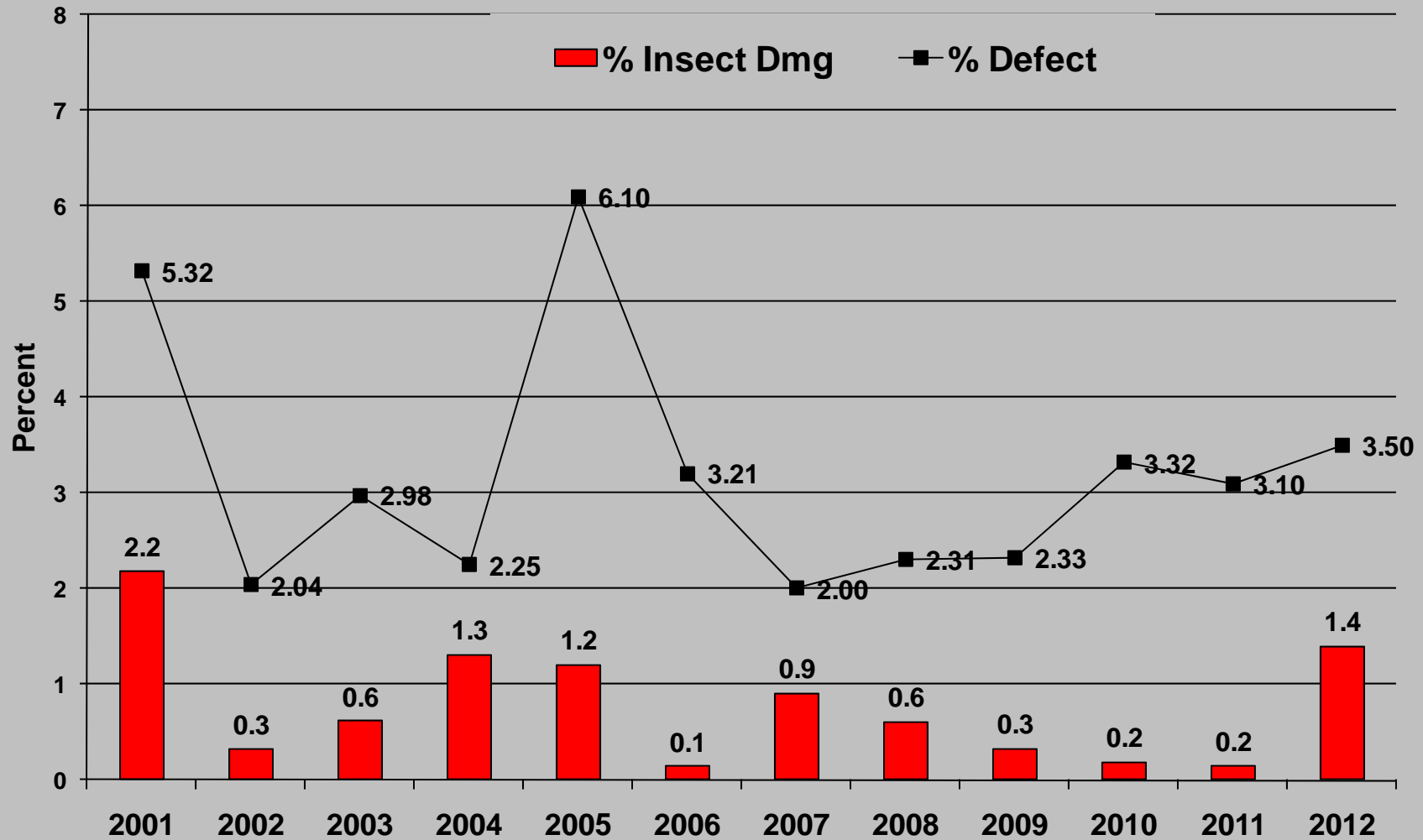
## Pistachio Sanitation Trial - 2013 NOW Pheromone Traps



## Pistachio Sanitation Trial - 2013 NOW Egg Traps

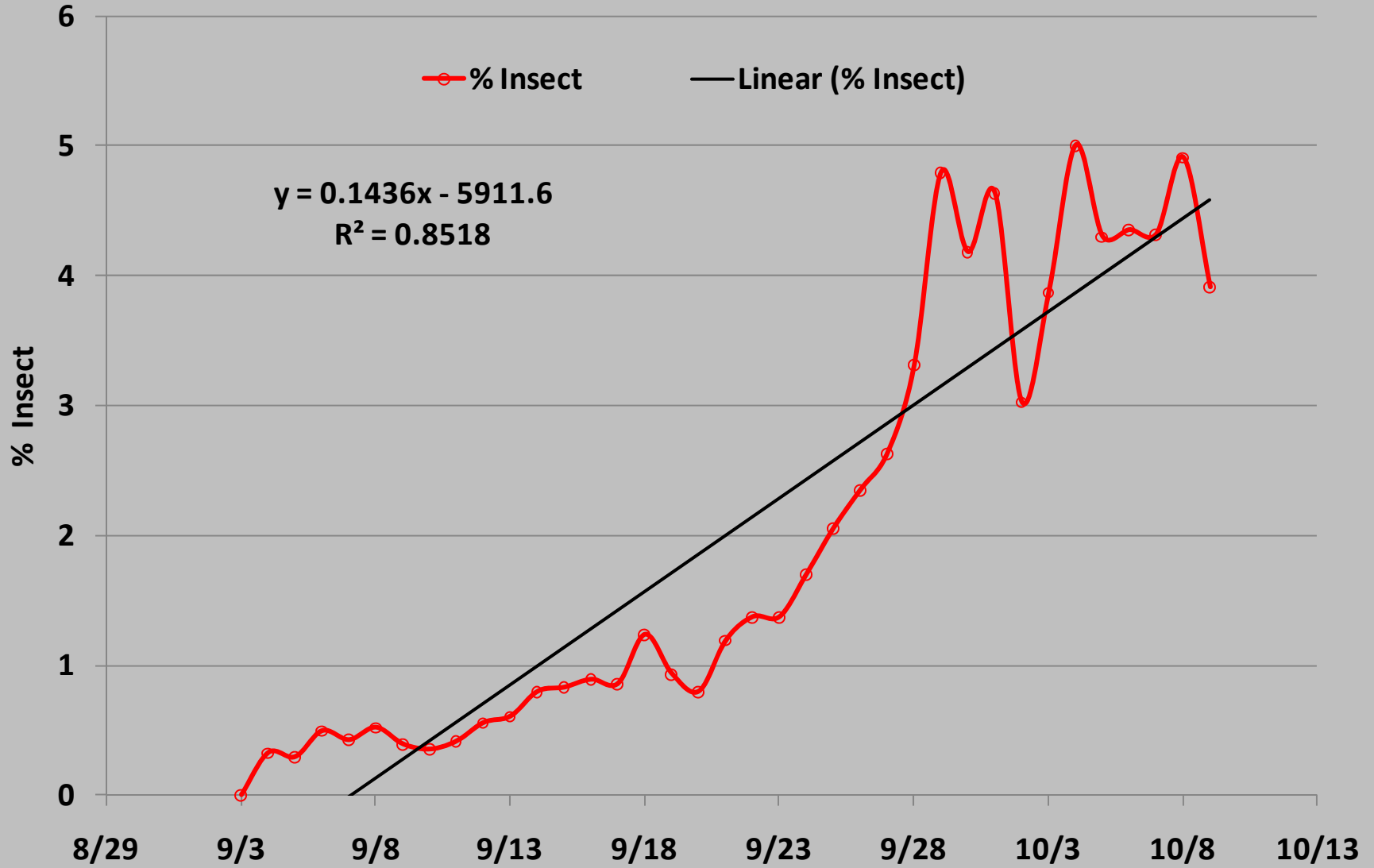


# PFC Pistachio Insect Damage From Gradesheets



# Kern County - 2012

9690 (10/11) loads

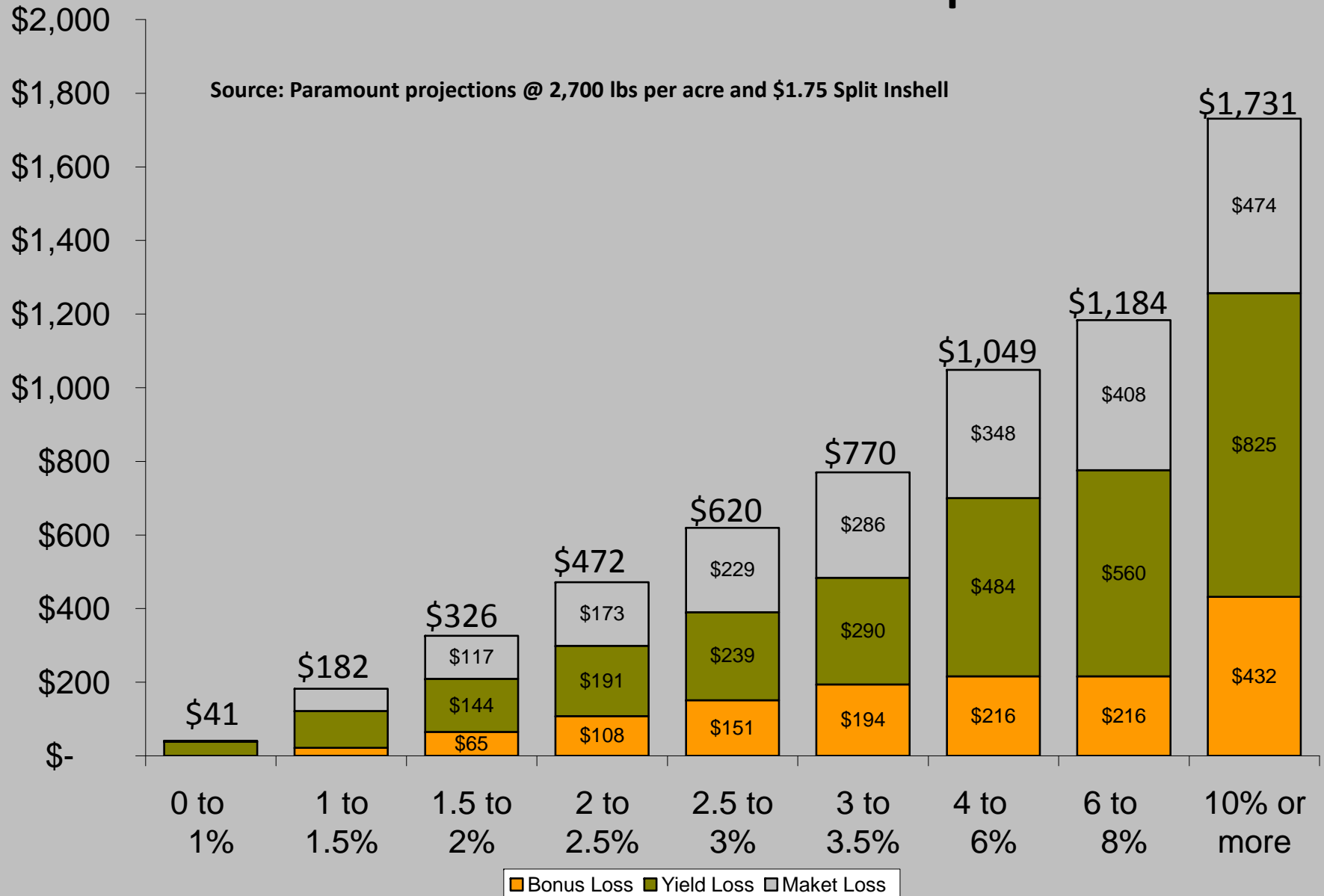


# How much is it worth to move from 2% → 0.5%?

- If pistachios grew in bags, difference easily seen, but....
- In field, How detect susceptibility?: 1/200 vs 4+/200
  - Intense monitoring – Cost? Maybe not that much, \$5-15/ac
- Sanitation – Improvements needed and are possible
- Insecticides – Pyrethroids may be slipping, this year will be telling.

# Overall real insect cost per acre

Source: Paramount projections @ 2,700 lbs per acre and \$1.75 Split Inshell



# Maximum NOW Control in Pistachios

- Early Harvest – Problematic for ALL acreage
- Improved Sanitation – may cost additional \$50/ac<sub>±</sub>
- Monitor and apply insecticides – more appls in years of increased susceptibility, or
- Apply 3-4 insecticide appls late July – early Sept – will need to mix MOA chemistries – additional \$100-200
- Wild Card: Mating disruption – May become the backbone of program

# NOW Insecticides in Pistachio

- Pyrethroids may be slipping
- Brigade and Warrior have had a tremendous impact on NOW pops and damage, particularly as the treated area increases in size
- A 2-3 spray program with different MOAs and well timed applications may be optimum, in both 1 and 2 harvest programs
- The Hull condition (susceptibility), along with NOW pops determine damage

## Permethrin

- Relatively little impact
- 1 day PHI allows flexibility

## Intrepid

## Altacor

## Belt

- Decent activity
- Coverage limits efficacy
- 14 or 10 day PHI can be problematic

## Brigade

## Warrior

## Danitol

- Greatest impact
- 7 day PHI
- Resistance?