



Joel Siegel: Research: 2002-Present

**Areawide program to control
Navel Orangeworm in
Almonds, Pistachios, and
Walnuts
2007-2012**

Scope



Two Valleys,
but how many
zones within a
valley?

Management
will be a
reflection of
NOW
pressure,
which in turn
will be
influenced by
environmental
factors

**Emphasis is on
introduction and
integration of existing and
new technology as well as
development of systems
approaches**

Demonstrate Available Technology

- Improved Sanitation
- Mating Disruption
- Selective Insecticides
- Damage Prediction

Predicting Nonpareil Almond damage in Kern County

1,279 40-acre plots 2004-2006

Average damage was 1.77%

INPUT

Percent Previous NOW Damage

Mean = 1.5% , (Range 0-19.0%)

1.50%

PTB Damage

Mean = 0.3% , (Range 0-9.2%)

0.3%

Ground Mummies per Tree

Mean = 4.9 , (Range 0-43.7)

4.9

Tree Mummies per Tree

Mean = 1.0 , (Range 0-69.7)

1

Standardized Harvest Percentile

Select a value from below and enter*

0

0-2.5% = -2.6

2.6% - 25% = -0.6

50% = 0

51-75% = 0.7

76-97.5% = 1.8

Last 98-100% = 2.6

Distance from Center to nearest Pistachios

8,656

Mean = 8,656 feet, (Range 550 - 12,000)*

*12,000 is the maximum value even if distance goes to 20,000

Predicted Damage

1.86%

To enter a value less than 1%, use decimals as in the following example

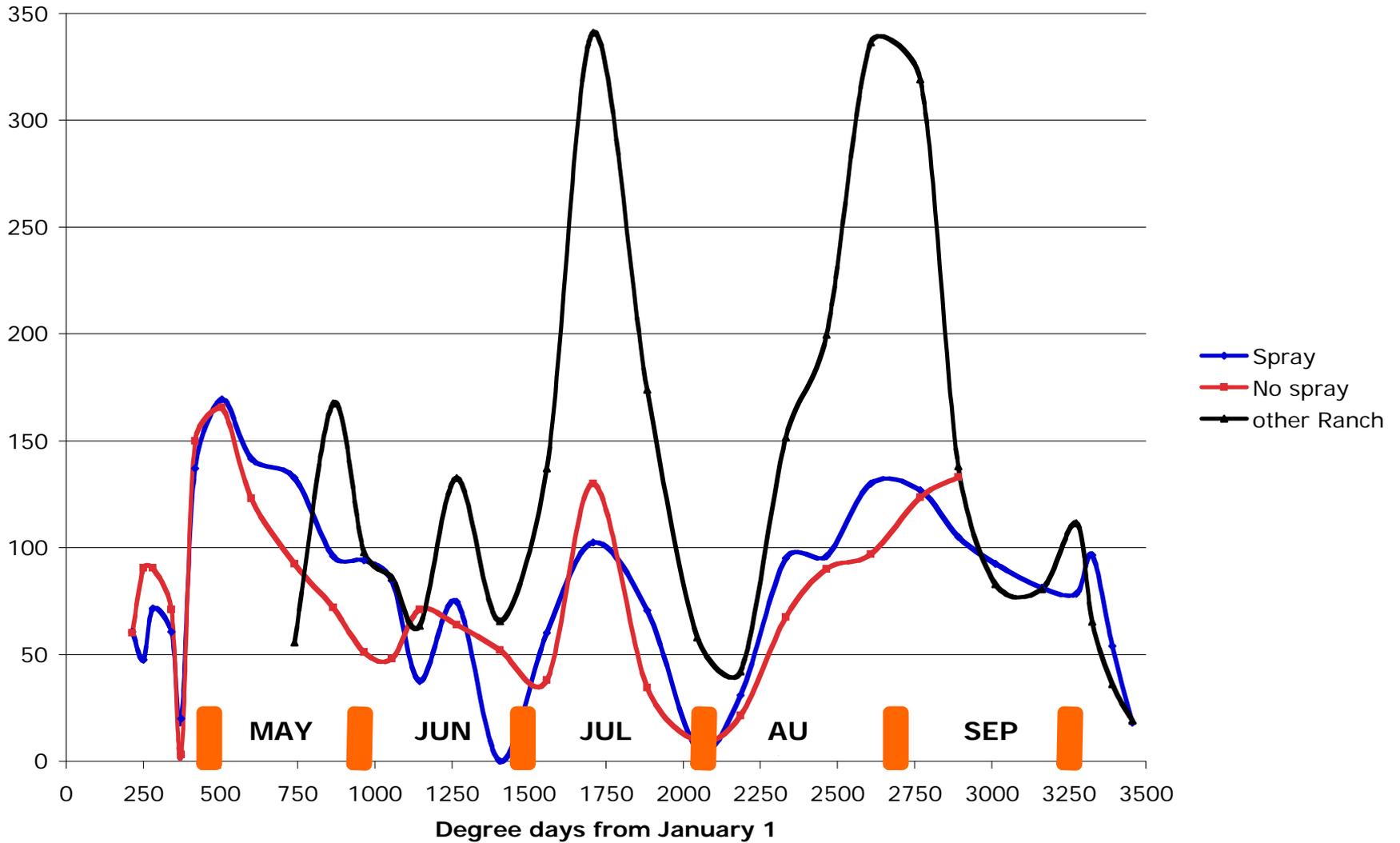
A value of 0.3%, or three tenths of a percent, is entered as 0.003

*Harvest risk is based on the comparison to the mean harvest date for the year. The mean date, when half the plots have been harvested, is entered as 0. Harvest before the mean has negative values, which reduce damage, and harvest after the mean has positive values, indicating increased damage compared to the mean date. All other parameters being equal and set to the means, the earliest harvested plots have a predicted damage of 1.36%, while the last harvested plots have a predicted damage of 2.31%. There is almost a 1% spread between the earliest and latest harvested plots, and the interval between the first harvested plot and last harvested plot is 27 days.

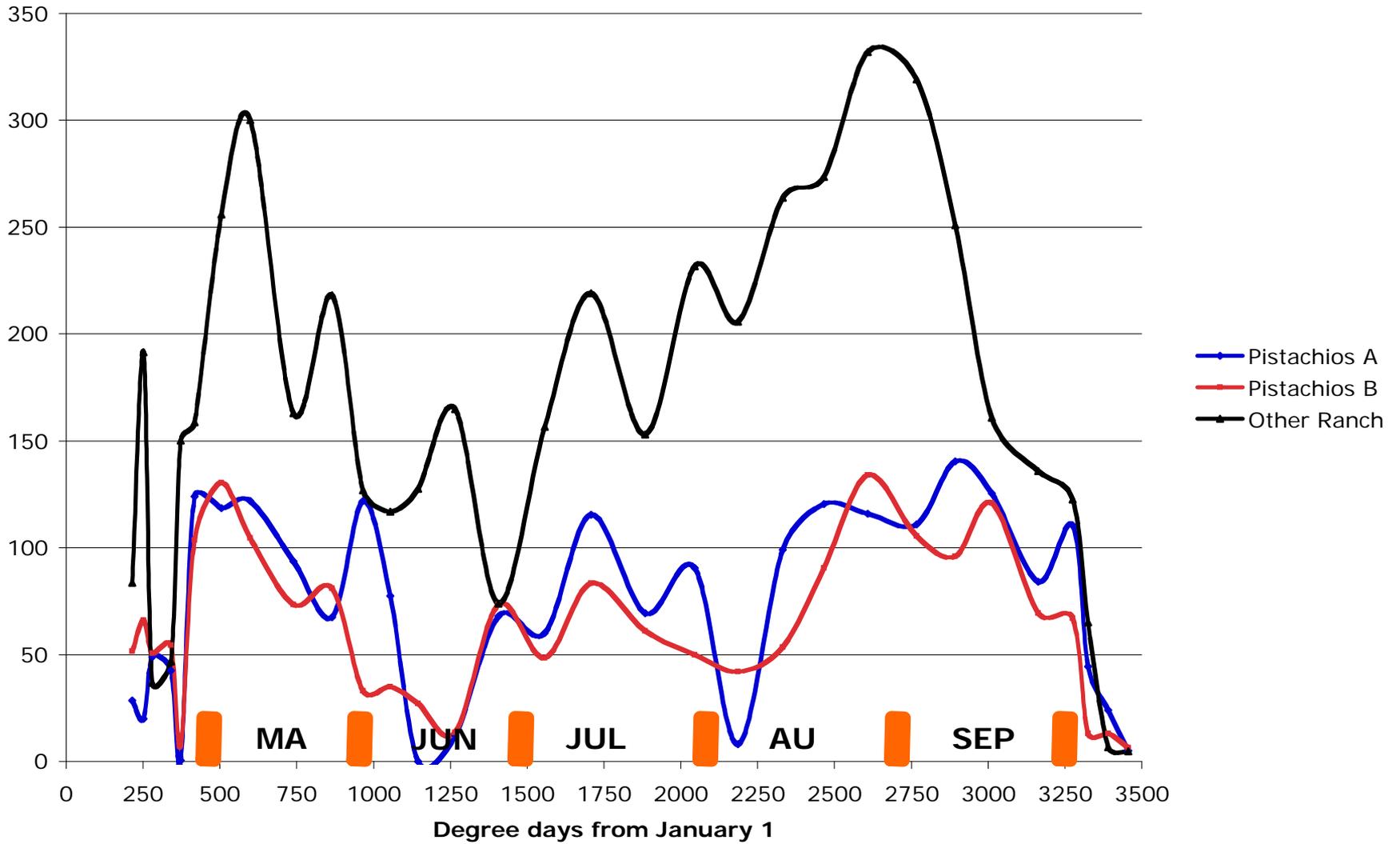
Impact on Nonpareil Kernel Damage

- **Tree Mummies**
- **Ground Mummies**
- **Proximity to Pistachios**
- ***Previous Year Damage**
- ***Harvest Date**
- ****Peach Twig Borer**

Almond Traps 2009

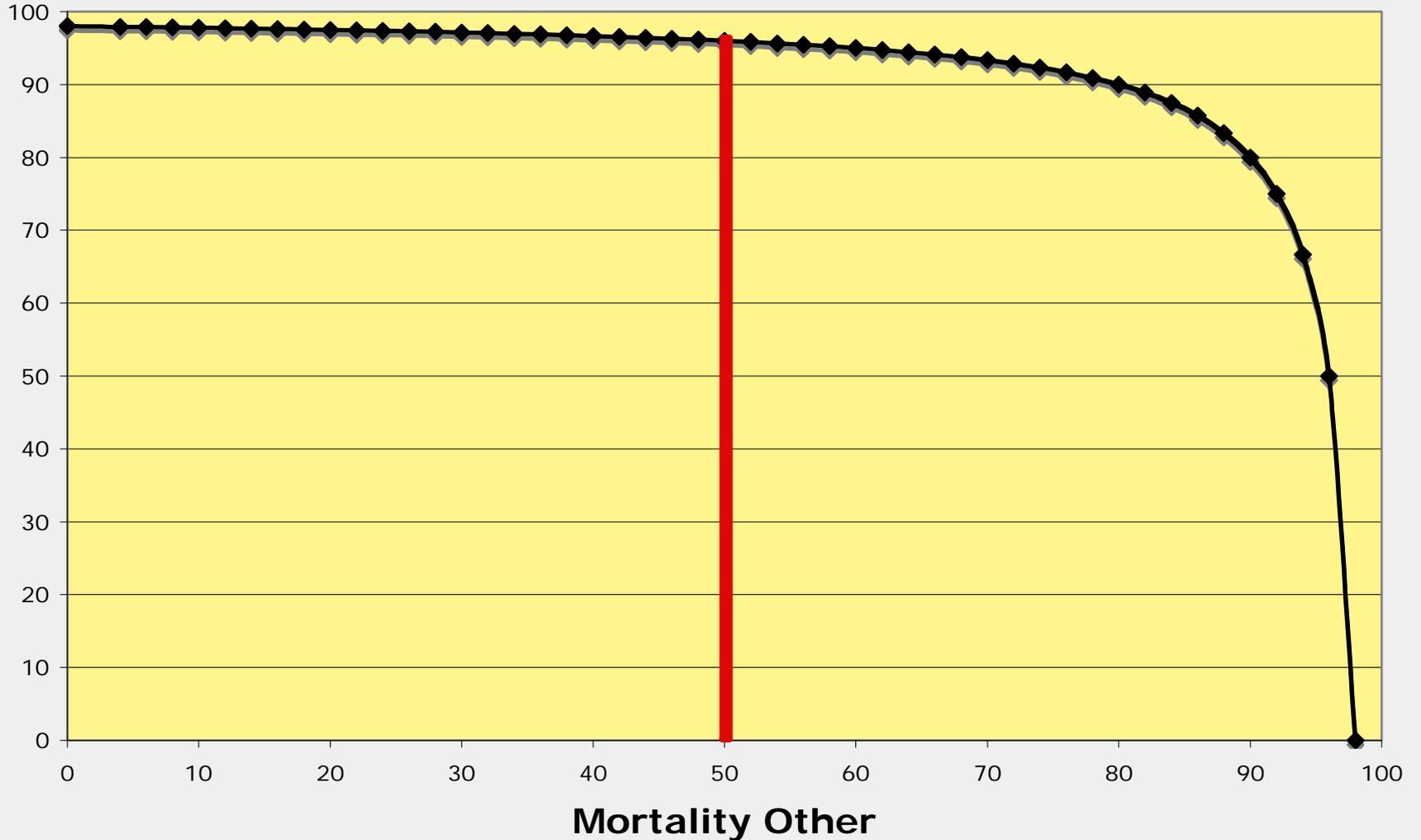


Madera Pistachios 2009



Assume 100 female eggs, all are independent

Insecticide Goal



3 Days Post Spray



Baythroid XL + Intrepid Madera County

| Day | Reduction | N | | Day | Reduction | N |
|-----|-----------|-----|--|-----------|--------------|-----|
| 9 | 90.4% | 800 | | 1 | 93.3% | 200 |
| 14 | 93.3% | 800 | | 6 | 76.4% | 600 |
| 15 | 85.4% | 800 | | 10 | 91.1% | 800 |
| 21 | 92.8% | 400 | | 14 | 93.6% | 600 |
| 26 | 98.1% | 400 | | 16 | 81.4% | 400 |
| | | | | 18 | 90.4% | 200 |
| | | | | 22 | 89.5% | 200 |
| | | | | 24 | 83.3% | 400 |
| | | | | 32 | 66.5% | 400 |

Warrior + Intrepid 2008

| Days after spray | Mortality | # of Eggs |
|-------------------------|------------------|------------------|
| 13 | 97.00 | 400 |
| 20 | 95.75 | 400 |
| 27 | 98.50 | 400 |
| 34 | 97.25 | 400 |
| 41 | 98.75 | 400 |
| 48 | 95.75 | 400 |

2008

| County | Total Percent Insect Damage | Unstain and Light stain Percent Insect Damage | Dark Stain Percent Insect Damage | Percent Split | Number of Loads |
|-------------------|------------------------------------|--|---|----------------------|------------------------|
| Colusa 2008 | 0.03 | 0.02 | 0.01 | 82.92 | 147 |
| | | | | | |
| Fresno 2008 | 0.25 | 0.12 | 3.36 | 84.41 | 1,754 |
| | | | | | |
| Kern 2008 | 0.68 | 0.34 | 9.10 | 90.12 | 3,176 |
| | | | | | |
| Kings 2008 | 1.48 | 1.07 | 10.31 | 92.05 | 1,060 |
| | | | | | |
| Madera 2008 | 0.75 | 0.30 | 9.31 | 80.44 | 1,591 |
| | | | | | |
| Tulare 2008 | 0.54 | 0.13 | 4.04 | 88.78 | 1,252 |

2008 Harvest

| County | NOW degree days (Time) | Percent Split | Percent Dark Stain | Percent Shell Defect | Percent Under 30/64 | Percent Blanks |
|---------------|---|--------------------------|-----------------------------------|-------------------------------------|------------------------------------|---------------------------|
| Colusa | + | + | - | - | - | - |
| Fresno | + | + | + | + | + | + |
| Kern | + | + | + | + | + | + |
| Kings | + | + | + | + | - | + |
| Madera | + | - | + | + | - | + |
| Tulare | + | + | + | + | + | + |

Thank You

