



Navel Orangeworm: Factors Affecting
Survival, Pesticide Efficacy, and
Development

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**7 Years of
Study
What Gives?**



Navel orangeworm: A Great
American Success Story

**A Supreme Scavenger,
Evolved in a totally
different system**

**Thrives on Mold,
Can Handle Aflatoxins
Inherently Variable**

What is the longest time to emerge?

Mummy pistachios that were baked at 180° F overnight, infested and held at

4,350 DD° F--174 Days

Peak at 4,850 DD° F-194 Days

How Quick?

As fast as 250-300 DD

**Nuts are a
changing resource**

**As food quality
decreases, development
time increases**

Food Quality

Degree Days/Temperature

Genetics

Degree Days are NOT Constant

MORE from mid Autumn through
Early June than calculated

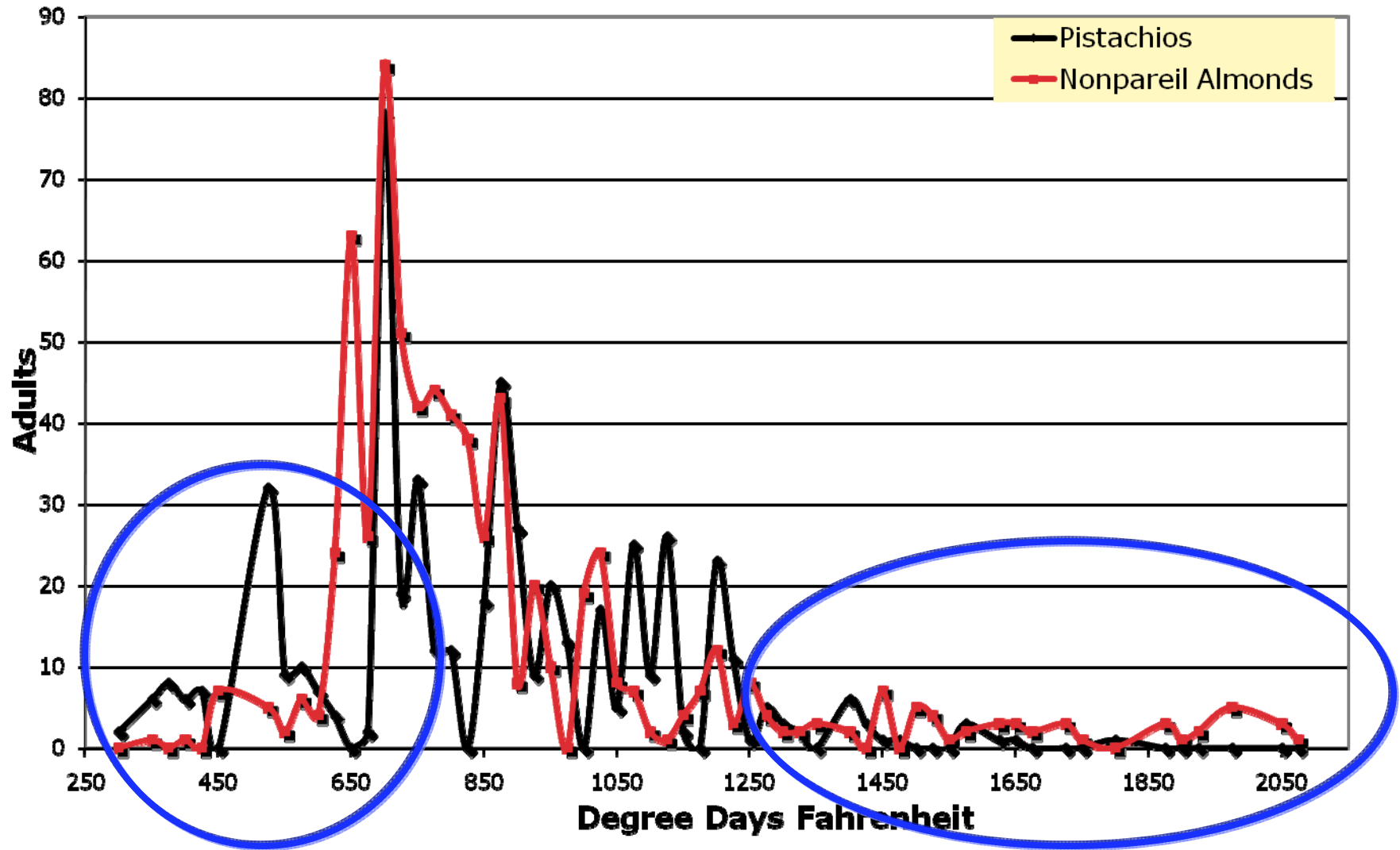
LESS throughout the summer than
calculated

Pistachios

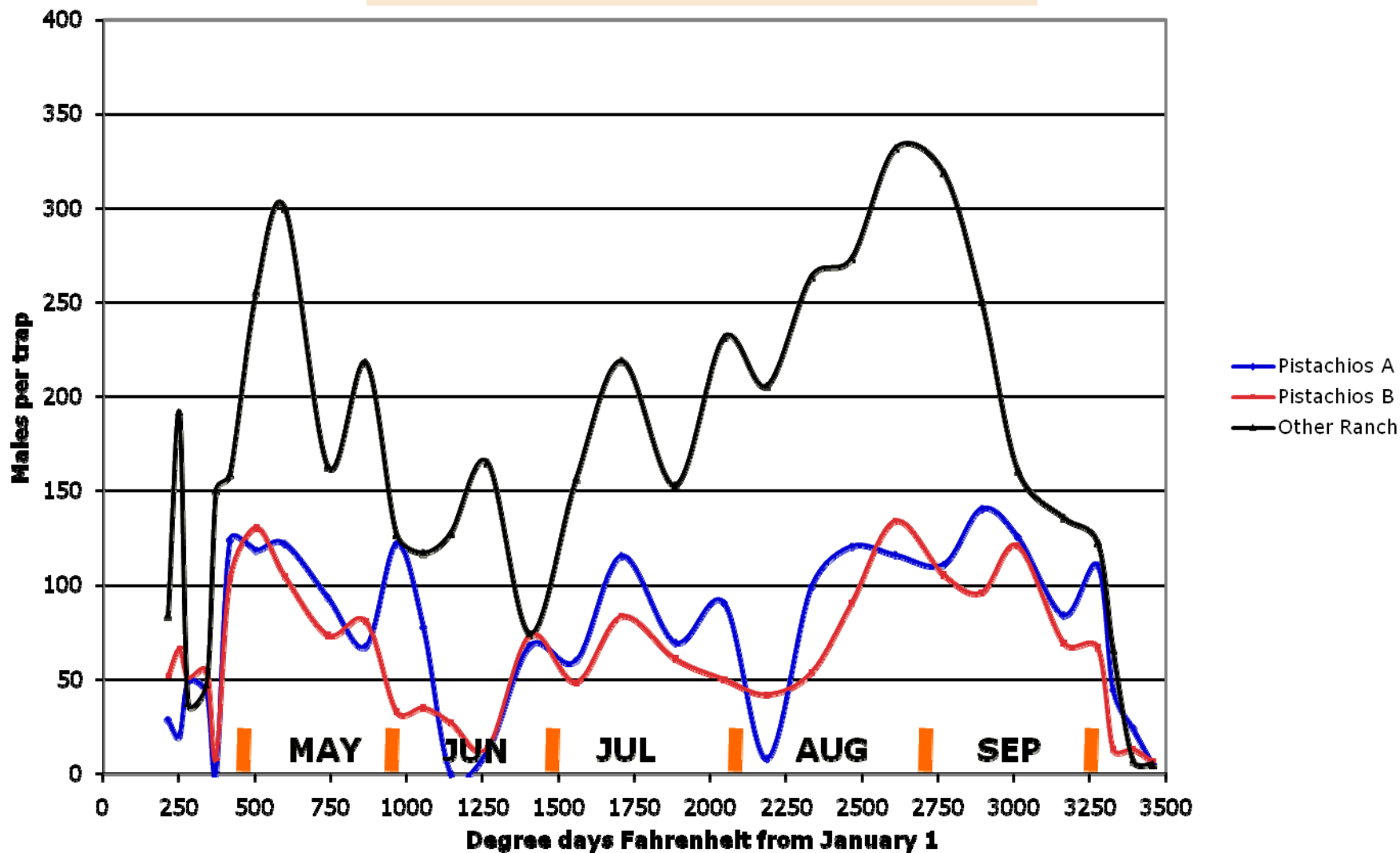
vs.

Almonds

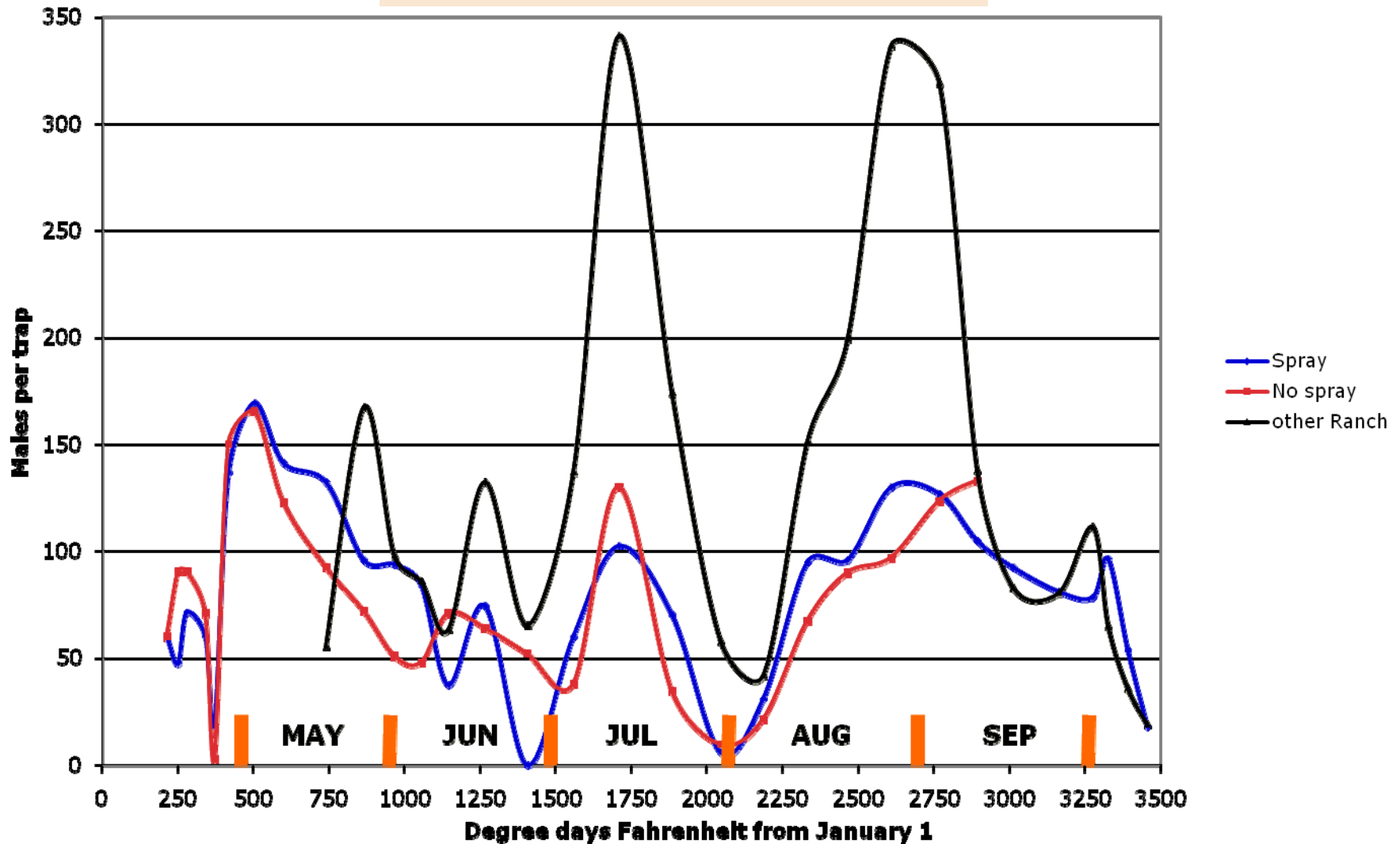
Emergence from Nonpareil Almonds vs. Kerman Pistachios



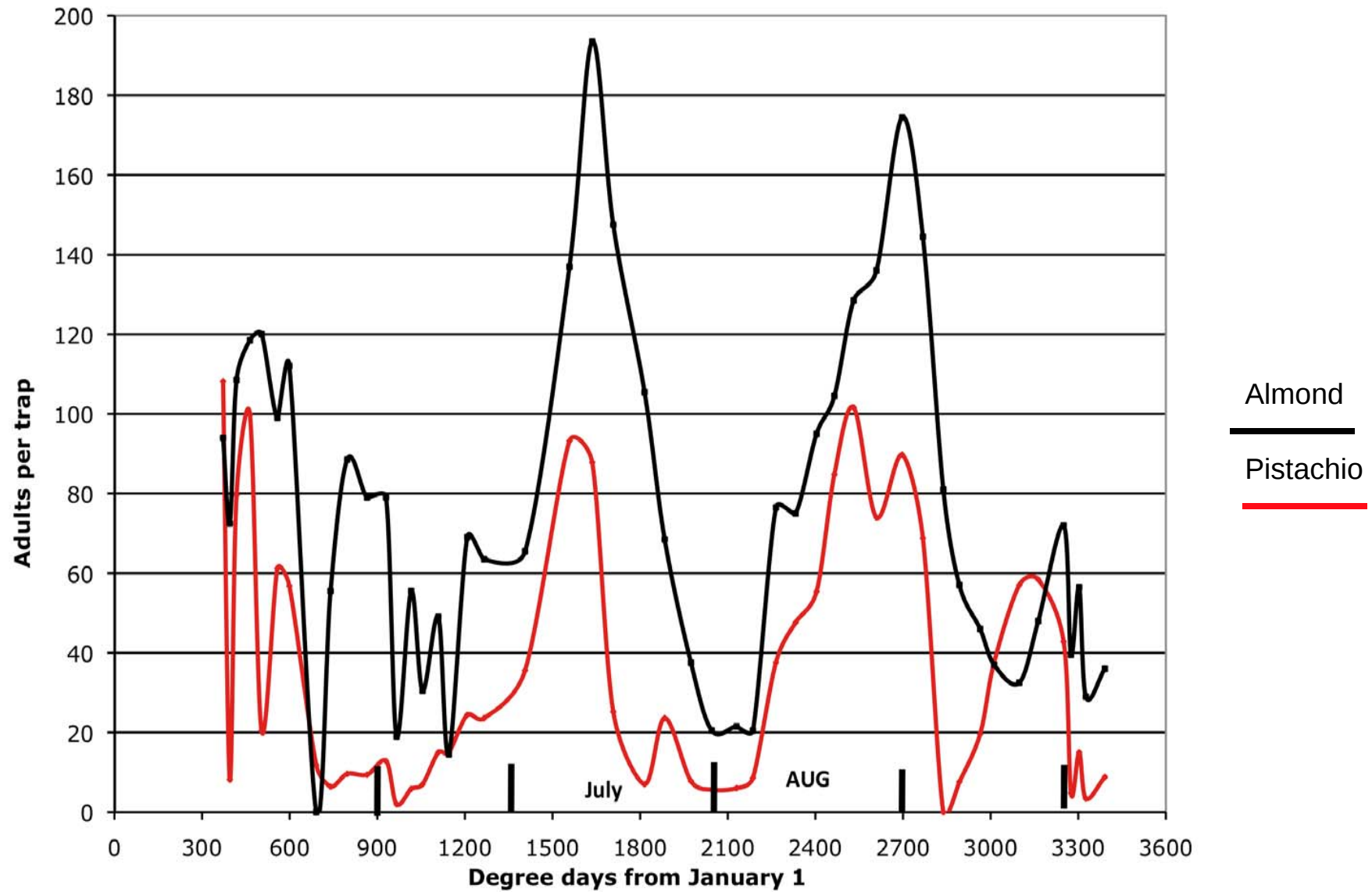
Pistachios



Almonds

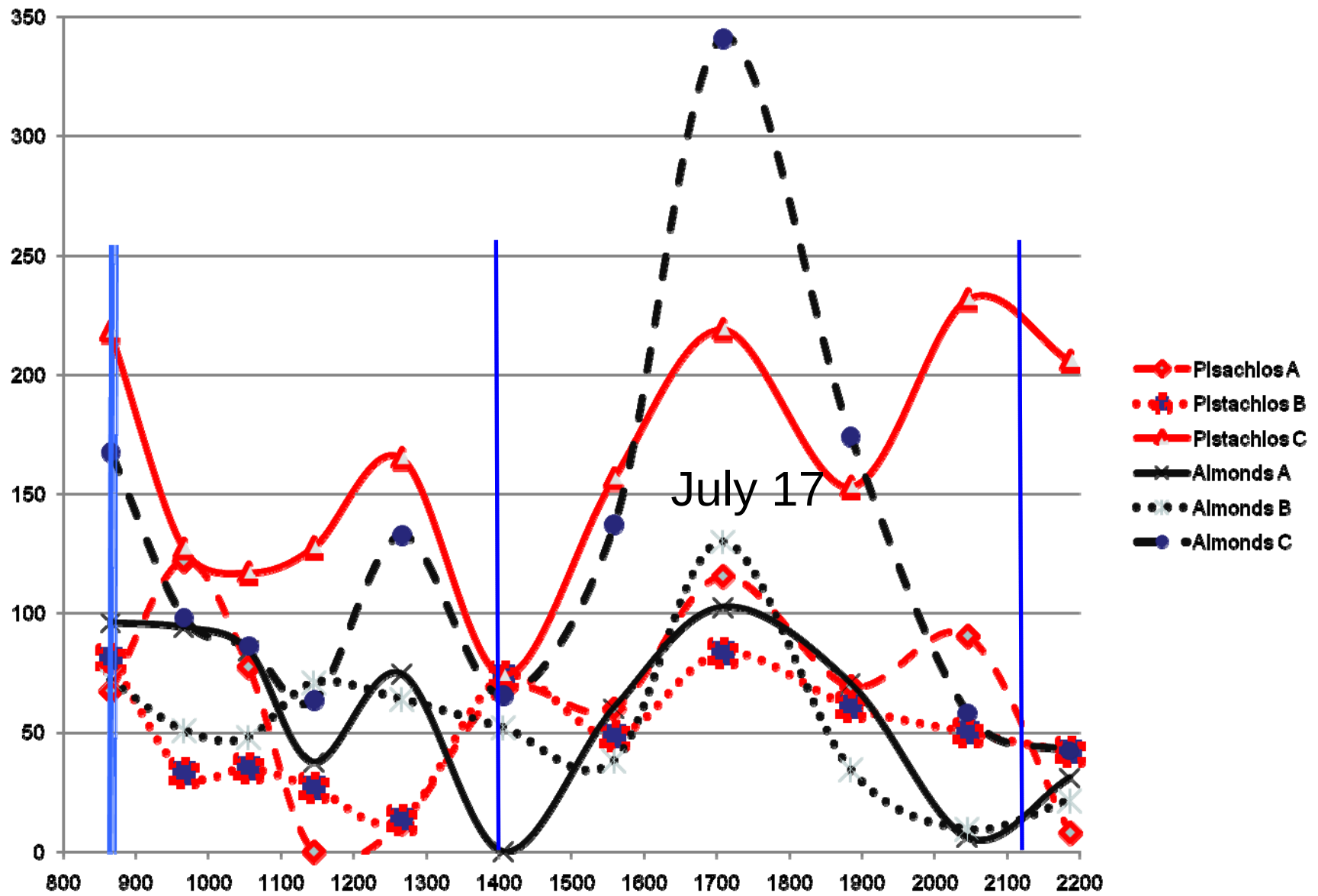


Almond and Pistachio



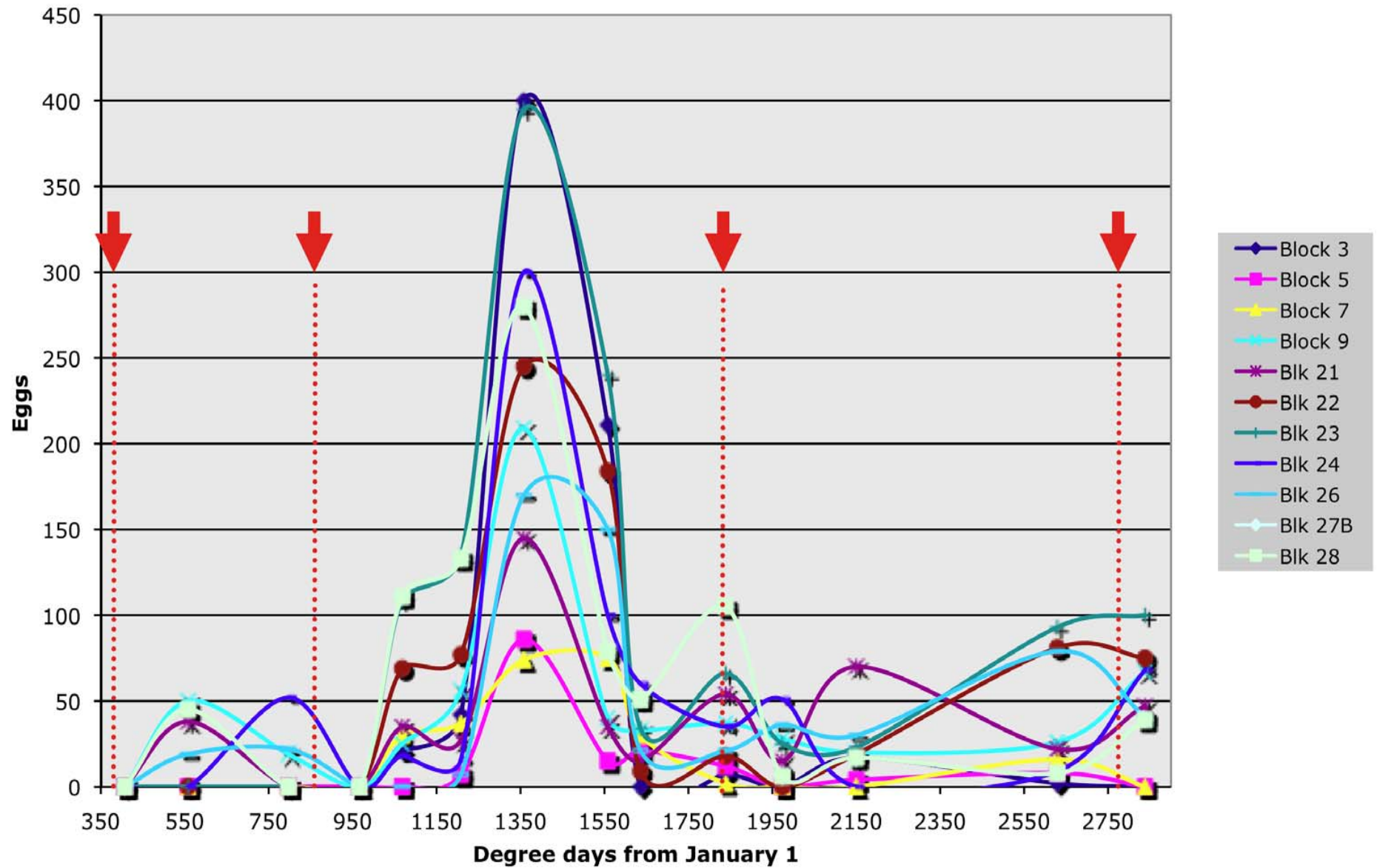
**But peaks in both
coincide**

Madera 2009



**constant
Pressure**

AgriWorld Egg Trapping

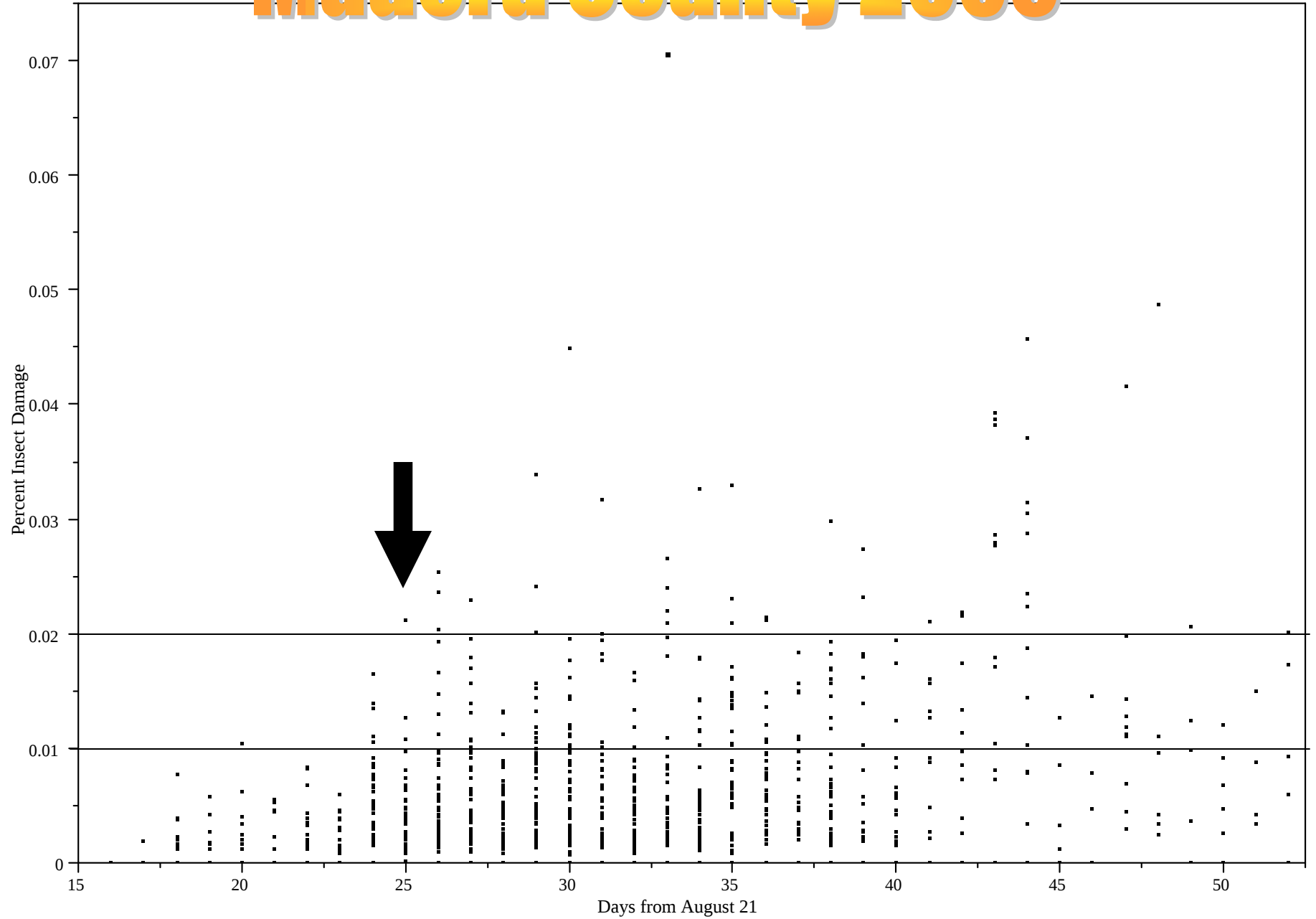


Harvest of 2009

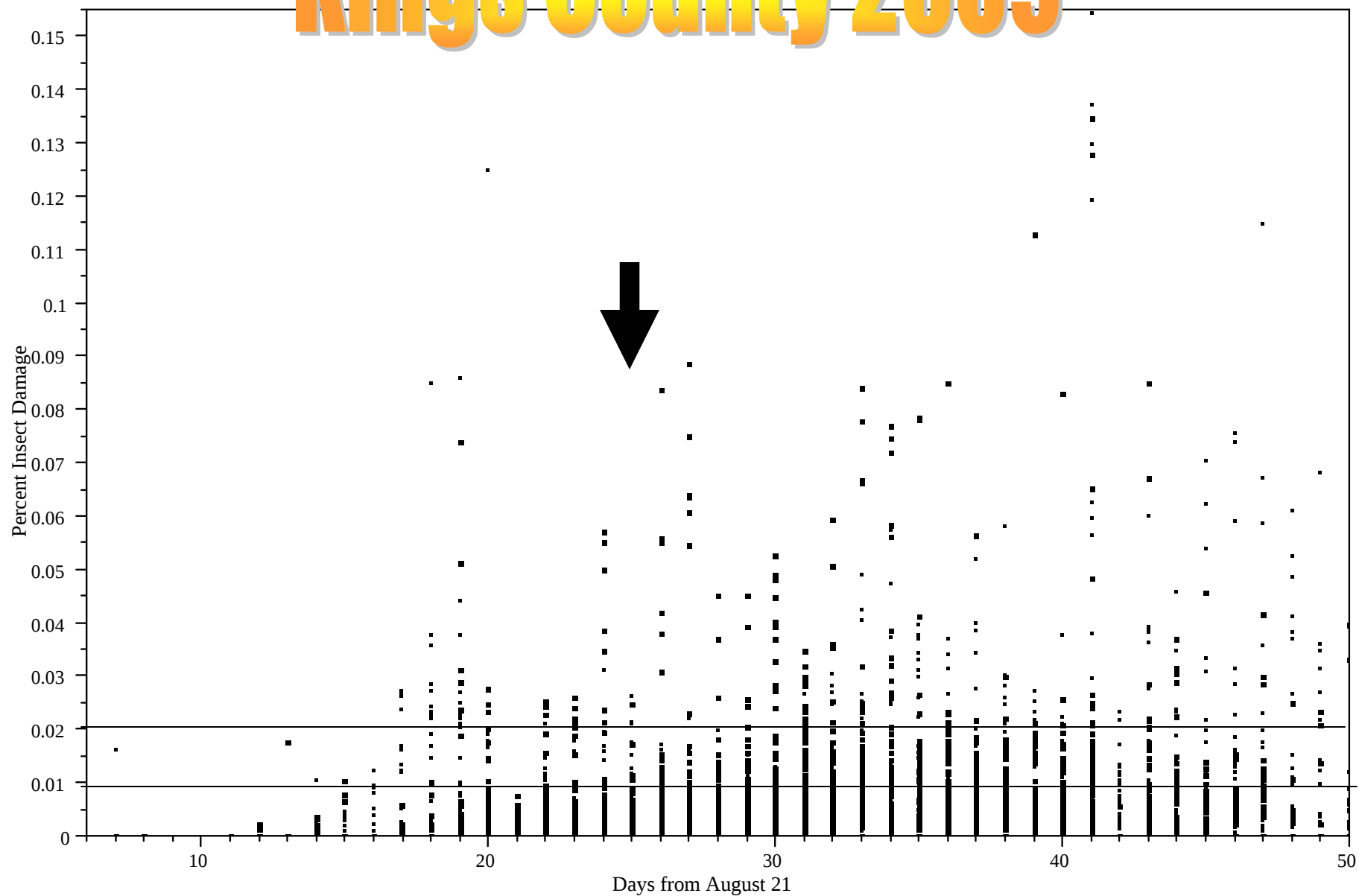
County	Avg. Damage (%)	High (%)	Net Dry Weight	N
Colusa	0.12	1.94	18,469	391
Fresno	0.19	4.87	17,864	1,269
Kern	0.29	6.09	17,721	798
Kings	0.90	15.43	17,285	823
Madera	0.59	6.53	19,009	1,274
Tulare	0.53	13.47	16,652	1,610

Great Year, But...

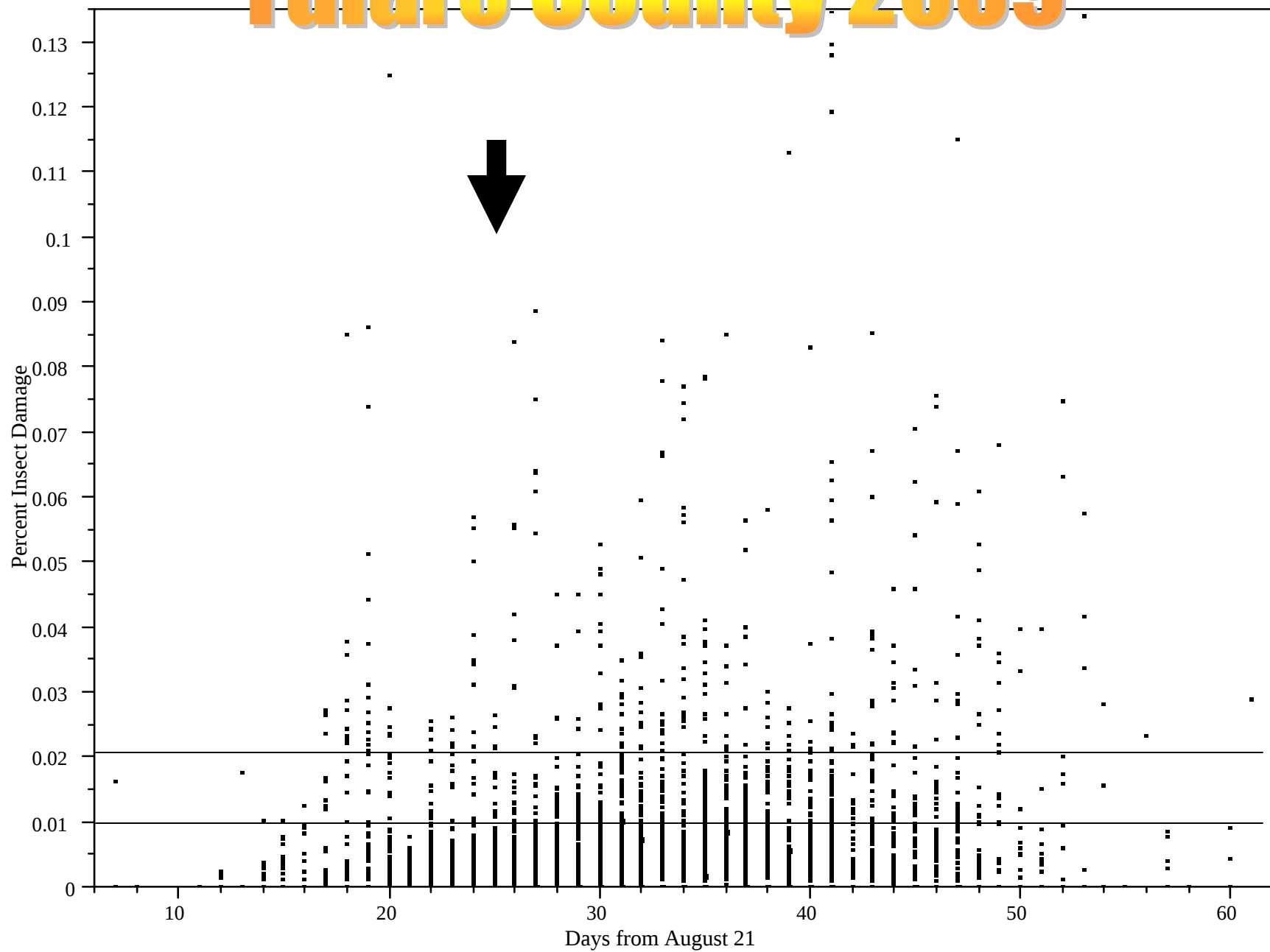
Madera County 2009



Kings County 2009



Tulare County 2009



Link to Insect Damage

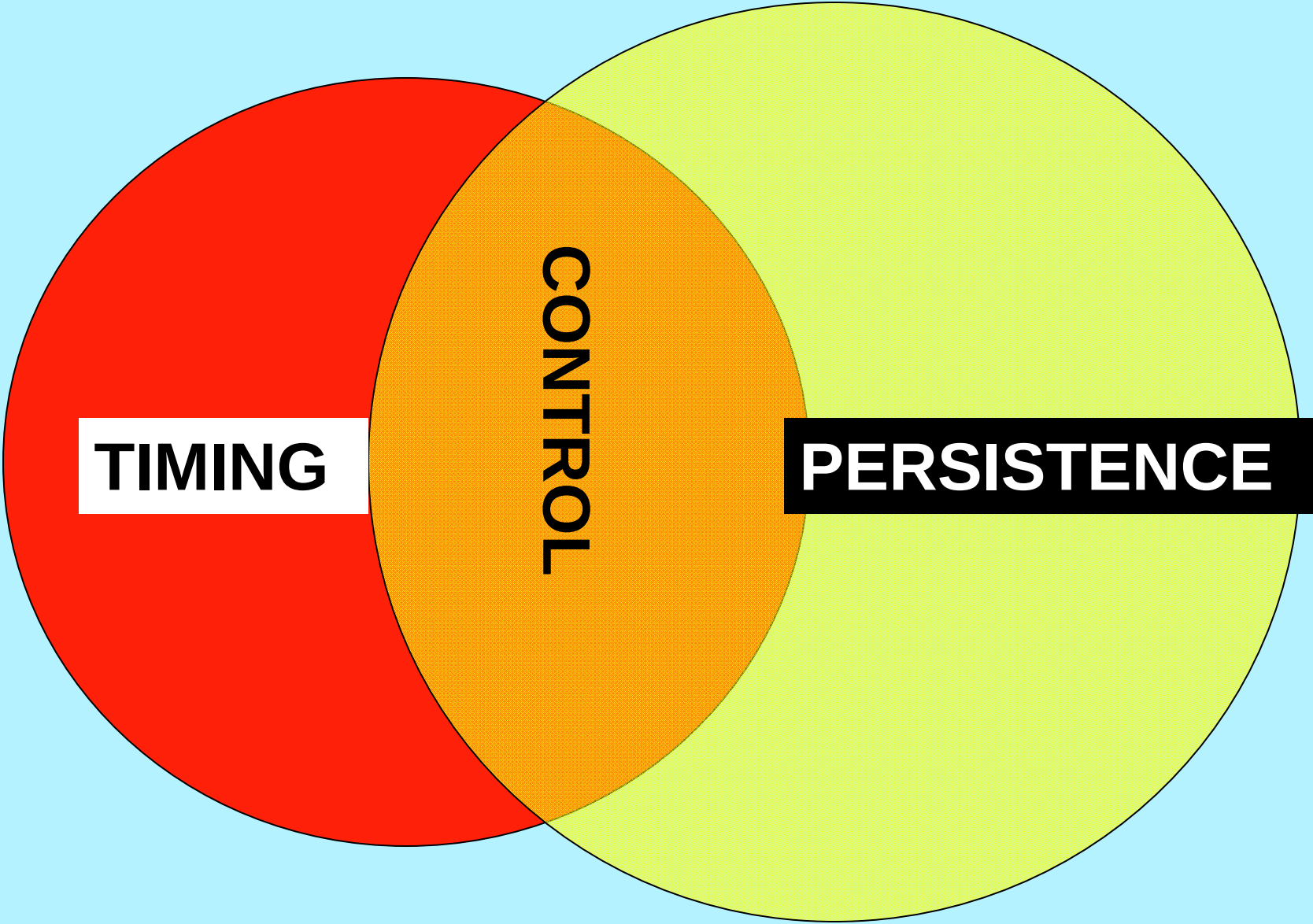
County	Time	% Splits	% Dark Stain	% Shell Defect	% Blanks
Colusa	-	-	-	-	+
Fresno	+	-	+	-	-
Kern	+	+	+	-	+
Kings	-	+	+	+	+
Madera	+	+	+	-	+
Tulare	+	+	+	-	+

Hull Split, Shell Integrity



Insecticides, Timing





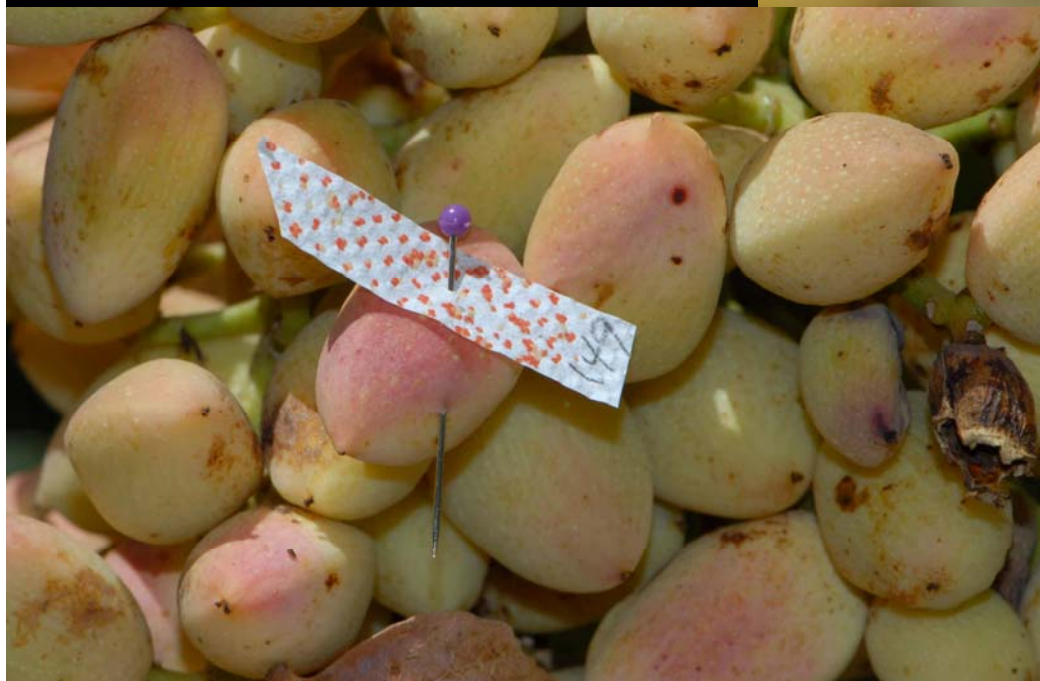
TIMING

A Venn diagram with two overlapping circles on a light blue background. The left circle is red and labeled 'TIMING'. The right circle is yellow and labeled 'PERSISTENCE'. The intersection of the two circles is shaded orange and labeled 'CONTROL'.

CONTROL

PERSISTENCE

Egg Targets

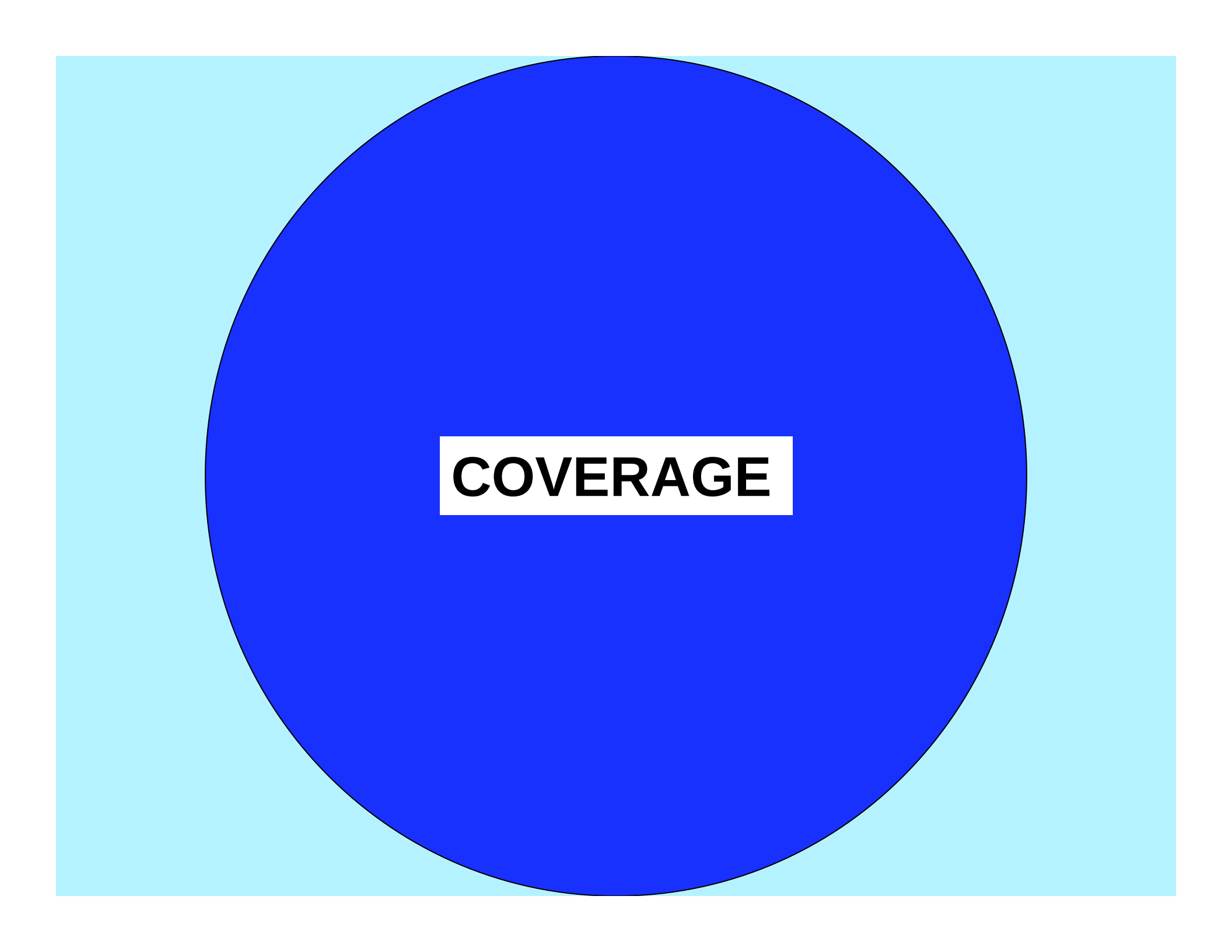


Ovicidal/Neonate Activity

Agent	Eggs	Survival	Year
Baythroid XL + Intrepid	3,700	1.35%	2007
Warrior + Intrepid	17,465	0.07%	2008
Brigade	47,287	1.66%	2008
Intrepid	6,881	4.68%	2009
Altacor	5,826	19.02%	2009
Belt	12,256	15.48%	2008
Assail	5,917	30.86%	2009

BUT

Insecticide	Eggs	Percent Survival	Reduction compared to Controls
Assail 10 day	200	0.5	98.8%
Assail 14 day	200	1.0	97.6%
Assail 21 day	200	2.0	95.3%
Assail 24 day	600	13.0	69.4%
Assail 34 day	200	16.5	61.1%
Altacor 10 day	200	0	100.0%
Altacor 14 day	200	0	100.0%
Altacor 21 day	200	0	100.0%
Altacor 24 day	200	1.5	96.5%
Altacor 34 day	200	1.0	97.6%
Intrepid 10 day	200	1.0	97.6%
Intrepid 14 day	200	0.5	98.8%
Intrepid 21 day	200	0	100.0%
Intrepid 24 day	400	2.5	94.1%
Intrepid 34 day	200	0	100.0%



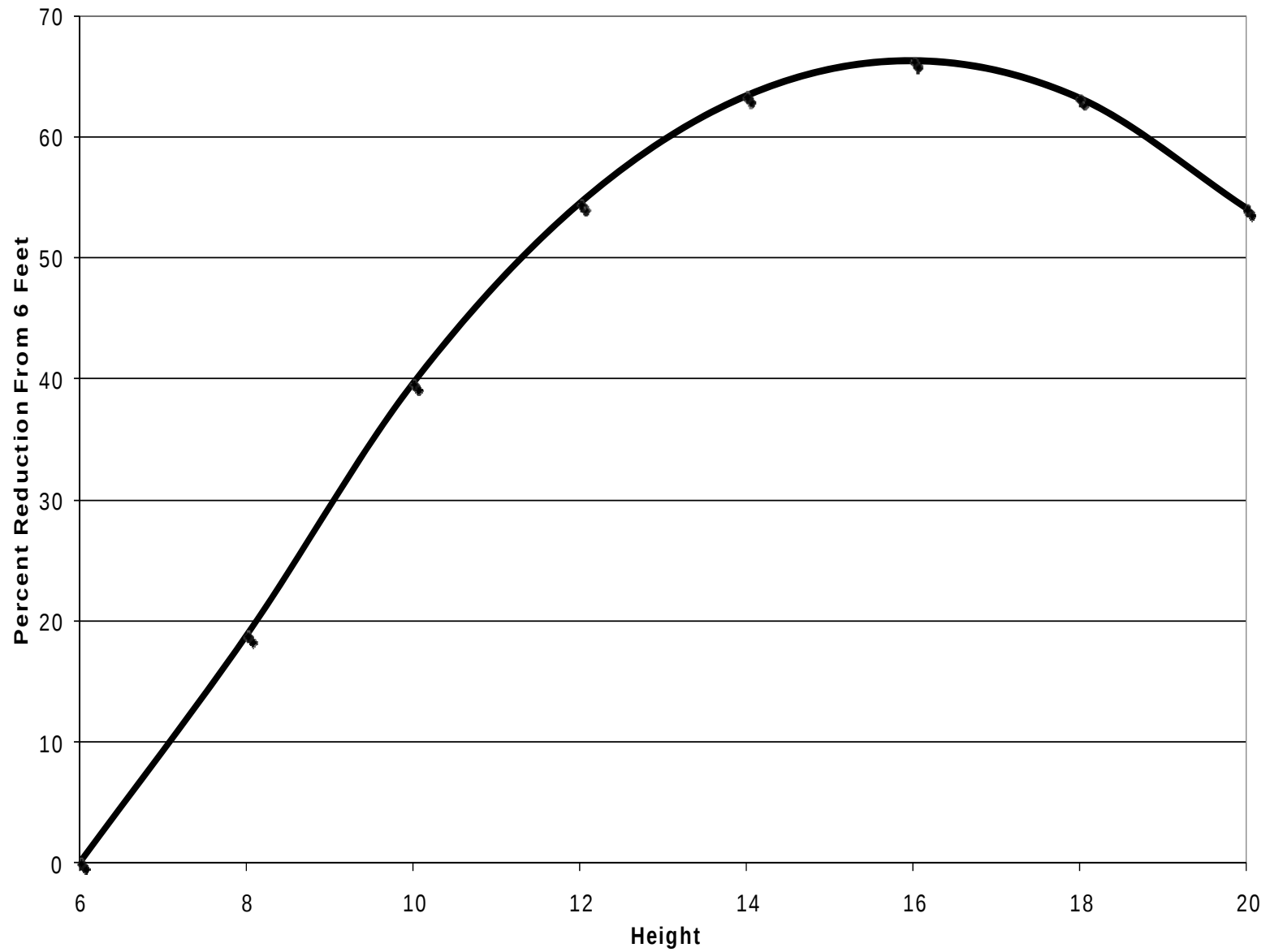
COVERAGE

**My thanks
to work of
Dr. Jack Dibble
1955-1991**

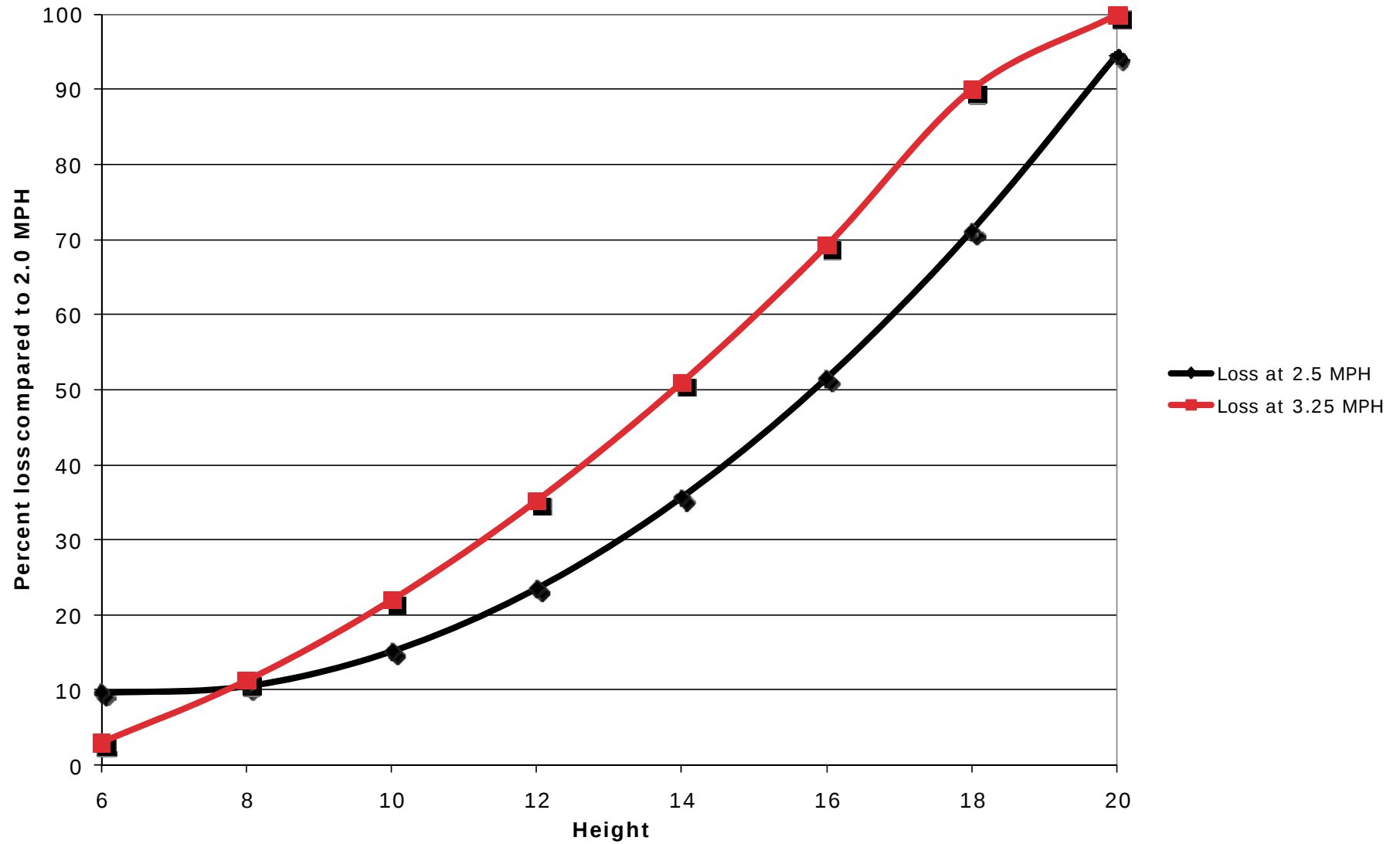
**Vertical Component,
Horizontal Component
(Penetration)**



Predict Loss 2.0 MPH

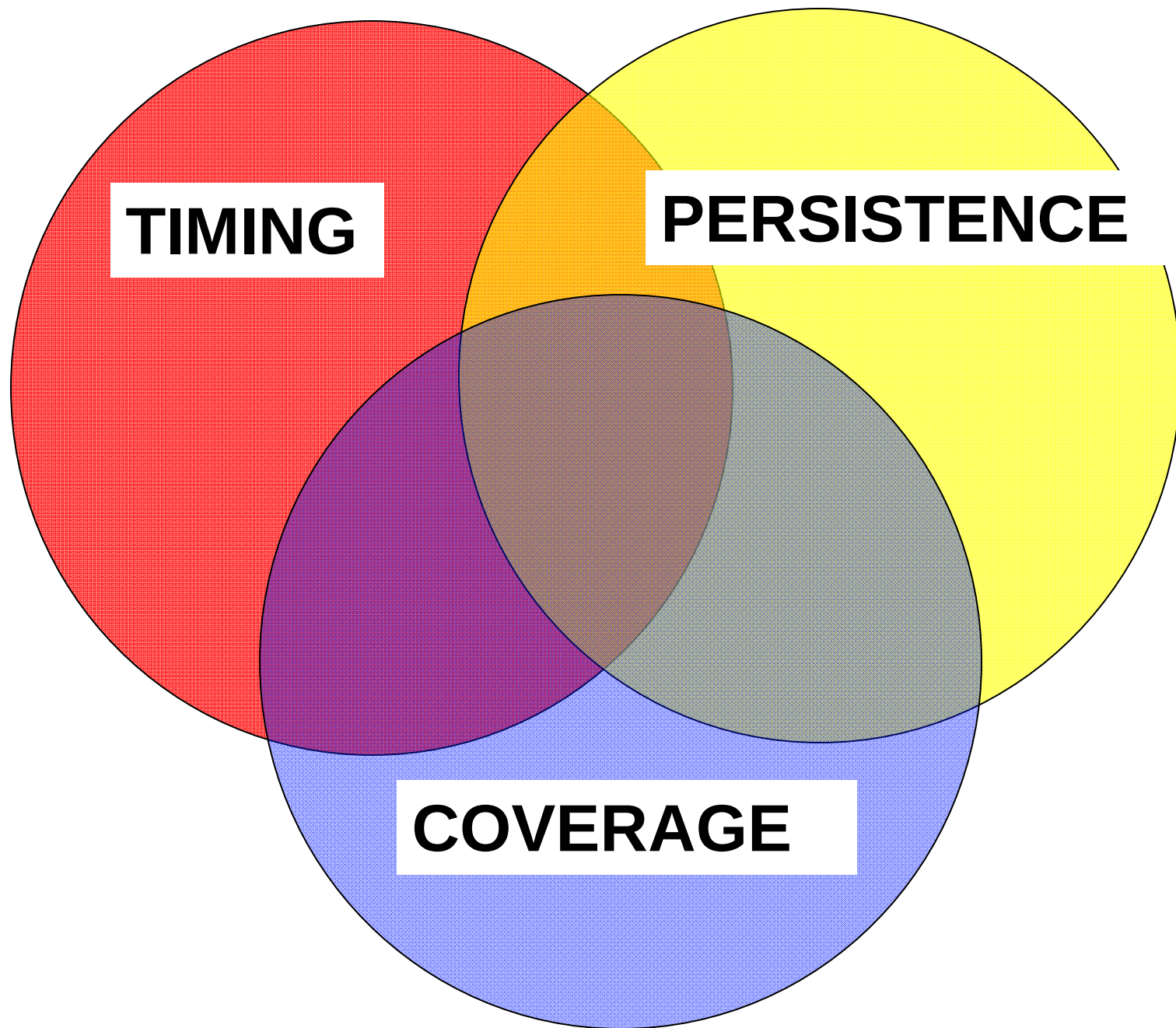


Spray reduction at 2.5, 3.25 MPH vs 2.0 MPH



Speeded

Kills



Thank You

