# North San Joaquin Valley Almond Day

Sponsored by UC Cooperative Extension

Coffee, donuts & snacks provided by:

**Yosemite Ag Credit**

# Cumulative Chilling Hours
# Nov. 1, 2009 - January 26, 2010

| | 2009-10 | 2008-09 | Average |
|---|---|---|---|
| Modesto | 857 | 998 | 857 |
| Patterson | 685 | 781 | 707 |
| Oakdale | 816 | 895 | 827 |

# Evaluation of fungicides and commercial bloom-applied materials for effects on almond set & yield

Roger Duncan

UC Cooperative Extension
Stanislaus County

Over the past several years, a number of materials have come to market with claims they increase almond yield and/or kernel size

"…enhances the uptake of nutrients"

"…helps mobilize nutrients within the plant"

"…minimizes plant stress…"

"Plant health response"

"University tested, grower approved"

# 2006 Madera Demonstration, Brent Holtz
# c.v. Carmel

| Treatment | Rate | Timing | |
|---|---|---|---|
| Goemar<br>BM 86 | 2 qt<br>2 qt | First Bloom<br>Full Bloom | |
| Goemar<br>BM 86 | 3 qt | Full Bloom | |
| Acadian | 2 qt<br>2 qt<br>2 qt | Full Bloom<br>Petal fall<br>3 weeks past PF | |
| Untreated | | | |

# 2006 Madera Demonstration, Brent Holtz
# c.v. Carmel

| Treatment | Rate | Timing | Kernel lb per tree |
|---|---|---|---|
| Goemar<br>BM 86 | 2 qt<br>2 qt | First Bloom<br>Full Bloom | 47.3 |
| Goemar<br>BM 86 | 3 qt | Full Bloom | 35.0 |
| Acadian | 2 qt<br>2 qt<br>2 qt | Full Bloom<br>Petal fall<br>3 weeks past PF | 34.4 |
| Untreated | | | 27.8 |

# 2006 Madera Demonstration, Brent Holtz
# c.v. Carmel

NOT REPLICATED. 5 TREES SPRAYED OF EACH

| Treatment | Rate | Timing | Kernel lb per tree |
|---|---|---|---|
| Goemar<br>BM 86 | 2 qt<br>2 qt | First Bloom<br>Full Bloom | 47.3 |
| Goemar<br>BM 86 | 3 qt | Full Bloom | 35.0 |
| Acadian | 2 qt<br>2 qt<br>2 qt | Full Bloom<br>Petal fall<br>3 weeks past PF | 34.4 |
| Untreated | | | 27.8 |

# 2007 Madera Replicated Trial, Brent Holtz, UCCE c.v. Nonpareil

## Replicated, scientific study

Materials applied at pink bud & full bloom

| Treatment | Rate | |
|---|---|---|
| Goemar BM86 | 2 qt | |
| CalMax Premium + BreakThru | 2 qt + 4 oz/100 | |
| Acadian + Cal Max T&V<br>+ BreakThru | 2 qt + 2 qt<br>+ 4 oz / 100 | |
| Untreated | | |

# 2007 Madera Replicated Trial, Brent Holtz, UCCE
# c.v. Nonpareil

## Replicated, scientific study

## Materials applied at pink bud & full bloom

| Treatment | Rate | Pounds / tree* |
|---|---|---|
| Goemar BM86 | 2 qt | 35.34 b |
| CalMax Premium + BreakThru | 2 qt + 4 oz/100 | 34.02 b |
| Acadian + Cal Max T&V + BreakThru | 2 qt + 2 qt + 4 oz / 100 | 37.63 b |
| Untreated | | 49.06 a |

Significantly higher yields in untreated trees

Two successive trials conducted

by Brent Holtz with

Goemar BM86 and Acadian

on pistachios showed either

no yield difference or

higher yields in untreated trees

# 2008 Field Trials

## Roger Duncan, Stanislaus County

**Orchard A**

- Location: West Modesto (Stone Rd.)
- Orchard Age: 8 years
- Varieties:
  - Nonpareil, Carmel, Aldrich
- Uniform, well fertilized orchard
- Excellent weather throughout bloom
- Grower did not apply foliar nutrients in trial area in 2008

# Stone Rd. Trial, 2008

| | | Bloom Stage | |
|---|---|---|---|
| Materials | Rate / acre | Nonpareil | Carmel |
| Hold | 2 qt Rezist +<br>2 qt Calcium 5S | 70-80% | 20-30% |
| Goemar<br>BM 86 | 3 qt | 90% | 50% |
| Exploit | 3 qt | 90% | 50% |
| Acadian<br>+ CalMax | 2 qt<br>+ 3 pints | 10%<br>+ petal fall | Popcorn<br>+ full bloom |
| CalMax<br>Premium | 3 pints | 10%<br>+ petal fall | Popcorn<br>+ full bloom |
| Untreated | -- | -- | -- |

# 2008 Field Trials

## Roger Duncan, Stanislaus County

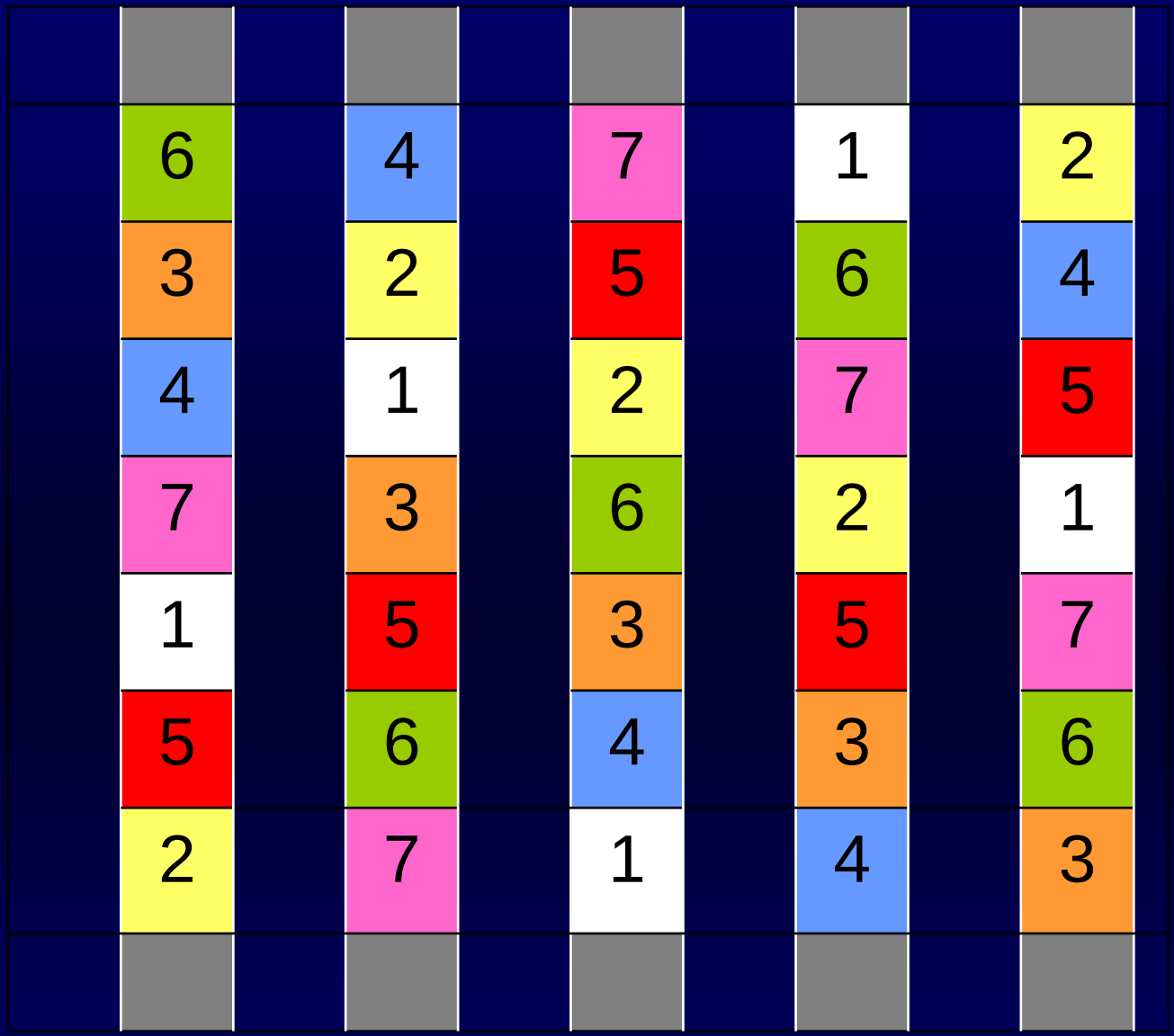
**Orchard B**

- Location: Ceres (Service Rd.)
- Orchard Age: ~12 years
- Varieties:
  - Butte & Padre
- Uniform orchard
- Excellent weather throughout bloom

# Service Rd. Trial, 2008

| | | Bloom Stage | |
|---|---|---|---|
| Materials | Rate / acre | Butte | Padre |
| Hold | 2 qt Rezist +<br>2 qt Calcium 5S | 90% | 40-50% |
| Goemar<br>BM 86 | 3 qt | 90% | 40-50% |
| Untreated | -- | -- | -- |

Materials applied with a commercial air blast sprayer




Materials were applied to 10 trees in a row in each of 5 randomly selected areas of the field

# Blossoms and almonds were counted to determine percent nut set for Hold® treatment

# Percent Nut Set of Hold®-Treated vs. Untreated Trees

## Stone Road Trial, 2008

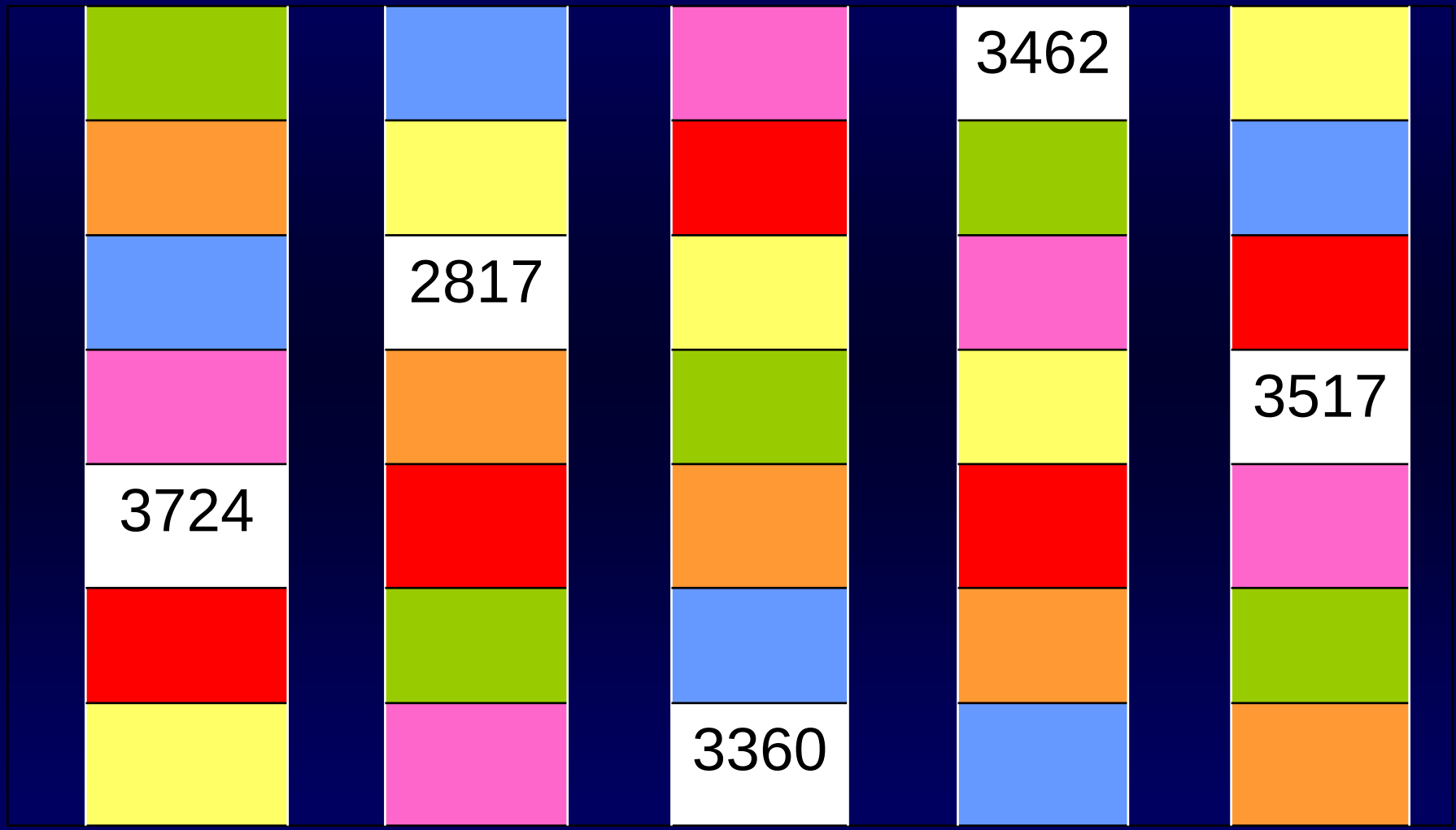
| | Nonpareil | Carmel |
|---|---|---|
| Hold® | 36.4% | 33.9% |
| Untreated | 40.7% | 38.4% |

Field weights are determined by harvesting into nut buggies fitted with a digital scale

Samples are collected in a bucket for quality assessment

# Yield Variability Within a “Uniform” Orchard

## Calculated yield in Untreated Trees




**Yield range: 2817 – 3715 lb per acre;  Average = 3339**

# Effect of Various Bloom-applied Products on Yield. Stone Road Trial, 2008

| | Nonpareil | | | |
|---|---|---|---|---|
| | Yield (lb / a) | Kernel size (g / 50) | | |
| Untreated | | | | |
| Hold | | | | |
| Goemar BM 86 | | | | |
| Exploit | | | | |
| Calmax Premium | | | | |
| Acadian + CalMax | | | | |

# Effect of Various Bloom-applied Products on Yield. Stone Road Trial, 2008

| | Nonpareil | | | |
|---|---|---|---|---|
| | Yield (lb / a) | Kernel size (g / 50) | | |
| Untreated | 3315 | 65.6 | | |
| Hold | 3350 | 63.9 | | |
| Goemar BM 86 | 3102 | 64.0 | | |
| Exploit | 3312 | 64.7 | | |
| Calmax Premium | 3169 | 66.7 | | |
| Acadian + CalMax | 3379 | 65.3 | | |

Nonpareil yield and kernel size data are statistically similar for all treatments

# Effect of Various Bloom-applied Products on Yield. Stone Road Trial, 2008

| | Nonpareil | | Carmel | |
|---|---|---|---|---|
| | Yield (lb / a) | Kernel size (g / 50) | Yield (lb / a) | Kernel size (g / 50) |
| Untreated | 3315 | 65.6 | 4231 a | 56.7 |
| Hold | 3350 | 63.9 | 4009 a | 55.7 |
| Goemar BM 86 | 3102 | 64.0 | 3777 ab | 57.2 |
| Exploit | 3312 | 64.7 | 4118 a | 56.5 |
| Calmax Premium | 3169 | 66.7 | 3433 b | 56.2 |
| Acadian + CalMax | 3379 | 65.3 | 3869 ab | 55.7 |

Nonpareil yield and kernel size data are statistically similar for all treatments

# Effect of Various Bloom-applied Products on Yield. Service Road Trial, 2008

cv ‘Butte’

| | Yield (lb / a) | Kernel size (g / 50) |
|---|---|---|
| Untreated | 3339 | 50.4 |
| Hold | 3500 | 50.3 |
| Goemar BM 86 | 3291 | 50.7 |

Yield and kernel size data are statistically similar for all treatments

# Stone Road Trial, 2009

*All materials applied in combination with foliar nutrient program

| Materials* | Rate / acre | Bloom Stage |
|---|---|---|
| Hold | 2 qt Rezist +<br>2 qt Calcium 5S | 50% bloom |
| Goemar BM 86 | 2 qt | Full bloom<br>+ petal fall |
| Symspray | 1 pint | Pink bud<br>+ petal fall |
| Powerline<br>Primer | 1 pint | Pink bud<br>+ petal fall |
| Acadian<br>+ Calmax | 2 qt<br>+ 3 pints | Pink bud<br>+ petal fall |
| Foliar nutrients* | | 50% bloom<br>+ petal fall |
| Untreated | -- | -- |

# Stone Road Trial, 2009

## Foliar Nutrient Treatment

(All other materials were applied in combination with foliar nutrient program)

| Materials | Rate / acre |
|---|---|
| Response® micronutrient fertilizer | 2.5 lb (early bloom)<br>5 lb (petal fall) |
| Formula One ® (0-29-26 phosphite fertilizer from phosphorus acid) | 1 pint |
| NutraCal (calcium) | 1 quart |
| Breakthru (silicone surfactant) | 3 oz |


NUTRI-CAL
0-29-26
acadian
100% LIQUID SEAWEED CONCENTRATE
0.3-0.0-5.0
PRIMER
BM86
Symspray 10x
weather guard

# Material Costs. Stone Road Trial, 2009

*All materials applied in combination with foliar nutrient program

| Materials* | Rate / acre | Bloom Stage | Cost / Acre |
|---|---|---|---|
| Hold | 2 qt Rezist + 2 qt Calcium 5S | 50% bloom | $88 ($116) |
| Goemar BM 86 | 2 qt | Full bloom + petal fall | $40 ($73) |
| Symspray | 1 pint | Pink bud + petal fall | $16 ($49) |
| Powerline Primer | 1 pint | Pink bud + petal fall | $25 ($58) |
| Acadian + Calmax | 2 qt + 3 pints | Pink bud + petal fall | $58 ($87) |
| Foliar nutrients* | | 50% bloom + petal fall | $33 |

# Effect of Various Bloom-applied Products on Yield. Stone Road Trial, 2009

| | Nonpareil | | Carmel | |
|---|---|---|---|---|
| | Yield | Kernels / oz | Yield | Kernels / oz |
| Untreated | | | | |
| Foliar Nutrients | | | | |
| Hold | | | | |
| Goemar BM 86 | | | | |
| Symspray | | | | |
| Powerline Primer | | | | |
| Acadian + CalMax | | | | |

# Effect of Various Bloom-applied Products on Yield. Stone Road Trial, 2009

| | Nonpareil | | Carmel | |
|---|---|---|---|---|
| | Yield | Kernels / oz | Yield | Kernels / oz |
| Untreated | 2233 | 19.3 | | |
| Foliar Nutrients | 2160 | 19.2 | | |
| Hold | 2090 | 19.1 | | |
| Goemar BM 86 | 2202 | 18.8 | | |
| Symspray | 2231 | 19.7 | | |
| Powerline Primer | 2345 | 19.0 | | |
| Acadian + CalMax | 2144 | 19.1 | | |

Yield and kernel size data are statistically similar for all treatments (P = 0.10)

# Effect of Various Bloom-applied Products on Yield. Stone Road Trial, 2009

| | Nonpareil | | Carmel | |
|---|---|---|---|---|
| | Yield | Kernels / oz | Yield | Kernels / oz |
| Untreated | 2233 | 19.3 | 1517 | 18.7 |
| Foliar Nutrients | 2160 | 19.2 | 1557 | 18.2 |
| Hold | 2090 | 19.1 | 1520 | 18.6 |
| Goemar BM 86 | 2202 | 18.8 | 1539 | 18.2 |
| Symspray | 2231 | 19.7 | 1563 | 18.5 |
| Powerline Primer | 2345 | 19.0 | 1776 | 17.9 |
| Acadian + CalMax | 2144 | 19.1 | 1722 | 18.3 |

Yield and kernel size data are statistically similar for all treatments (P = 0.10)

# Acadian Use in Almonds

John Edstrom, UCCE Colusa

Combination of foliar & soil treatments

cv. ‘Ruby’

- Foliar Applications Acadian LSC
  - Pink bud (2 qt)
  - Petal fall (2 qt)
- Soil application Acadian LSC (drip)
  - May 10 (2 qt)
  - July 17 (2 qt)

# Effect of Acadian Foliar and Soil Treatments on Yield of Ruby Almonds. J. Edstrom

| | Acadian | Untreated |
|---|---|---|
| Rep 1 | 1992 | 2104 |
| Rep 2 | 1900 | 2574 |
| Rep 3 | 2144 | 2068 |
| Rep 4 | 2716 | 2020 |
| Rep 5 | 2594 | 2175 |
| Rep 6 | 2358 | 1994 |
| Rep 7 | 2336 | 2641 |
| Rep 8 | 2039 | 2280 |
| Average | 2260 | 2232 |

Yield data are statistically similar for all treatments

# Summary

- Brent Holtz, John Edstrom and I were unable to increase yield or kernel size with any material in any of the seven scientifically valid field trials.
- It is possible that one or more of these materials may work in some situations
- My advice: be skeptical and ask to see scientifically valid, unbiased data on tree crops
- Even better: invest that money in soil moisture monitoring equipment or a pressure bomb!

# Testing Pristine Fungicide for Effects on Almond Yield

# Pristine Trial

## Roger Duncan Stanislaus County 2009

- Pristine @ full bloom
- Pristine @ 14 days after full bloom
- Pristine @ 28 days after full bloom
- Gem @ full bloom
- Gem @ 14 days after full bloom
- Gem @ 28 days after full bloom
- Untreated

*Whole block was sprayed with Vangard @ early bloom & Tilt @ petal fall

# Yield and Kernel Size Summary of Pristine Trial.

Roger Duncan, 2009

| | Nonpareil | | Carmel | |
|---|---|---|---|---|
| | Yield (lb / acre) | kernels / oz | Yield (lb / acre) | kernels / oz |
| Untreated | 2035 | 20.1 | | |
| Pristine @ full bloom | 2332 | 20.0 | | |
| Pristine 14 days after FB | 2146 | 20.0 | | |
| Pristine 28 days after FB | 2312 | 20.3 | | |
| Gem @ full bloom | -- | -- | | |
| Gem 14 days after FB | 2385 | 20.4 | | |
| Gem 28 days after FB | 2396 | 20.0 | | |

Yield data are statistically similar for all treatments (P=0.10)

# Yield and Kernel Size Summary of Pristine Trial.

Roger Duncan, 2009

| | Nonpareil | | Carmel | |
|---|---|---|---|---|
| | Yield (lb / acre) | kernels / oz | Yield (lb / acre) | kernels / oz |
| Untreated | 2035 | 20.1 | 1960 | 18.5 |
| Pristine @ full bloom | 2332 | 20.0 | 1598 | 19.5 |
| Pristine 14 days after FB | 2146 | 20.0 | 2015 | 19.3 |
| Pristine 28 days after FB | 2312 | 20.3 | 2066 | 19.4 |
| Gem @ full bloom | -- | -- | -- | -- |
| Gem 14 days after FB | 2385 | 20.4 | 1991 | 17.9 |
| Gem 28 days after FB | 2396 | 20.0 | 1899 | 18.4 |

Yield data are statistically similar for all treatments (P=0.10)

# Yield and Kernel Size Summary of Pristine Trial #1.

Jim Adaskaveg. Kern County 2008.

| **Full Bloom** | **5 wks after petal fall** | Kernel pounds per tree | **LSD** |
|---|---|---|---|
| Vangard 5 oz | Rovral 1 lb/Ziram 8 lb | 39.2 | a |
| Pristine 14.5 oz | Rovral 1 lb/Ziram 8 lb | 39.0 | a |

# Yield Summary of Pristine Trial #2.

## Jim Adaskaveg. Kern County 2009

| 1rst spray | 2nd spray | Yield (lb / tree) |
|---|---|---|
| Vanguard @ FB | Rovral + Ziram @ 5 wks after petal fall | 28.2 a |
| Pristine @ FB | Rovral + Ziram @ 5 wks after petal fall | 28.4 a |
| Vangard @ FB | Pristine @ 20 days after petal fall | 26.0 ab |
| Vangard @ FB | Gem @ 20 days after petal fall | 22.7 b |

# Summary of Pristine Trials

- My trial indicated an “insignificant trend” towards higher yields with Pristine fungicide
  - May warrant another look
- Able to get the same response with Gem (another strobilurin)
- No difference if applied at bloom or 4 weeks after bloom
- Jim Adaskaveg was unable to see any effect with Pristine or Gem