

# Pacific Spider Mite and Navel Orangeworm Control in the Lower San Joaquin Valley

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## Pacific Spider Mite

### Pacific Spider Mite Trials

Third leaf Almonds, UCCE Almonds Orchard, Kern Co.



Pacific spider mite is one of the most common pests of almonds in the lower San Joaquin Valley. Typical management programs include one to two miticide applications per season. Over the past few years we have conducted research on many new miticides to determine their efficacy and optimal use pattern. This research has led to an understanding of how to use products such as abamectin, Zeal, Onager, Envirdor, Fujimite and Acramite.

During the 2011 season we continued our efforts towards understanding options for control of spider mites. This included screening on new miticides, evaluations of adjuvants and surfactants with potential of improving control, and the effects of new generation pyrethroids on spider mite outbreaks.

#### Effects of Oil, Vintre, and Potassium Nitrate on miticide efficacy

Adjuvant studies showed that adjuvants can have a significant impact on miticide efficacy. During 2011 we evaluated Vintre (Figure 1) and potassium nitrate (Figure 2) as adjuvants to three or four miticides. Results varied according to surfactant. In our first year of doing these evaluations the performance of Envirdor and Acramite (which must kill mites through contact) was improved with the use of potassium nitrate whereas Zeal (which has translaminar activity) had improved control with the addition of Vintre compared to oil. We will follow up on these results as part of our research program in 2012.

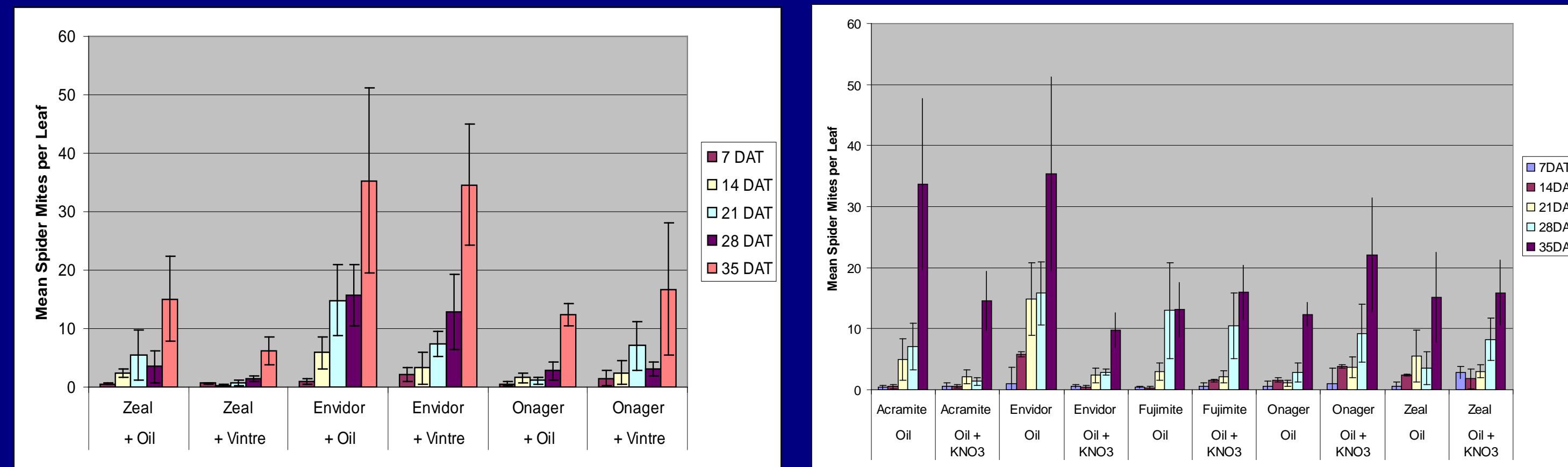


Figure 1 and 2. Effects of Vintre and potassium nitrate as adjuvants with several different miticides on spider mite density.

#### Effects of Pyrethroids on spider mites

In 2011 we evaluated three new-generation pyrethroids (Danitol, Brigade and Warrior) for their effects on spider mites. The overall result was that Danitol, Brigade and Warrior were not as good as the industry standard miticide Zeal, but they did cause a slight numerical reduction in mite density and did not flare mites through 35 DAT.

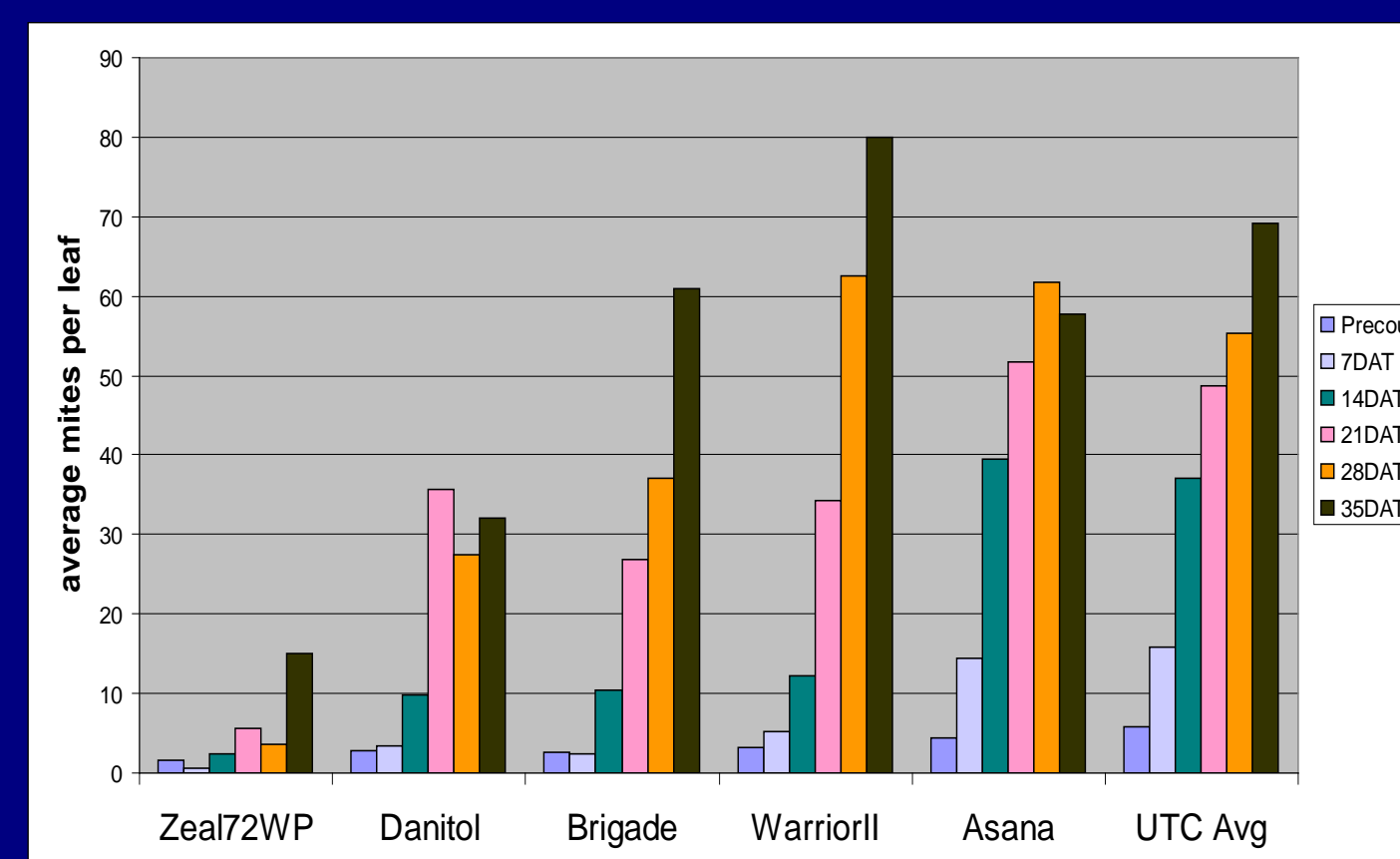


Figure 3. Effects pyrethroids used for navel orangeworm treatments on spider mite densities.

#### Effects of new miticides on spider mites

Several new products were also evaluated for their effects on spider mite densities. Stealth (a soybean oil by Pacific Biocontrol) showed similar effects as 415 oil in the trial. Nealta a new miticide by BASF produced significant reductions in mite density compared to the untreated check, but not as good as several industry standards. Work on use patterns for this product continue.

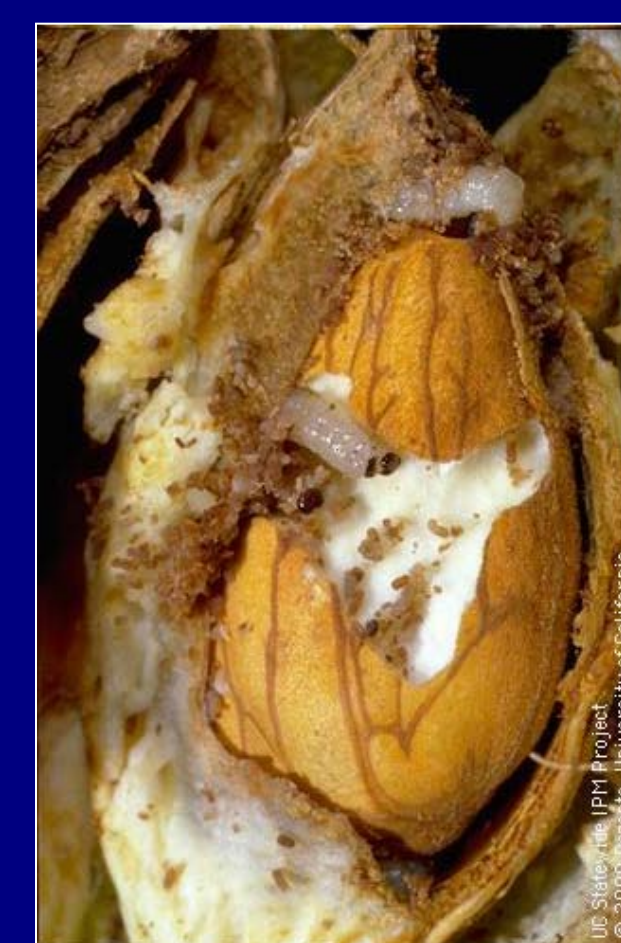
## Pacific Spider Mite cont.

Vigilant is a miticide by Chemtura that has the same a.i. as Acramite (bifenazate). The results were rate dependent, and with increased rates of Vigilant, increased amounts of residual control was provided. Control provided by the 1 lb rate of Acramite was comparable to a rate of Vigilant somewhere between the 20 and 24 fl oz rate. Mite densities treated with Vigilant were significantly lower than that of the untreated check through 14 DAT (16 fl oz/acre), 28 DAT (20 fl oz/acre), and through at least 35 DAT (24 fl oz/acre).

#### Effects of industry standards on spider mites near hull split

Miticide trials with the industry standards Envirdor, Zeal, Acramite, Onager, and Fujimite continue to show excellent control with these products when used with oil at hull split. Analysis of trials over a five-year period from 2006 to 2011 have shown that all five products can provide excellent control when mite populations are low and starting to build, and that Fujimite and Zeal are the best options when mite populations are high and a knock-down product is needed. In all cases good coverage is essential.

## Navel Orangeworm



Navel orangeworm is the most significant insect pest of almonds in California and routinely requires insecticide treatments for its control. Over the past few years, several new insecticides have become available for NOW control, with several others still under development. The objective of this project is to conduct screening trials of these new products to determine which are the best candidates for larger scale field trials and for use in commercial settings.

#### Effects of NOW treatments on Spider Mites

Figure 4 and 5 show the effects of navel orangeworm treatments at hull split at the West Side Research and Extension Center orchard on spider mite densities four weeks after treatment. In 2010 (left) pyrethroids (red) caused an increase in mite densities compared to the untreated check and other insecticides for navel orangeworm (blue). In 2011 the use of pyrethroids did not have a negative effect on mite densities.

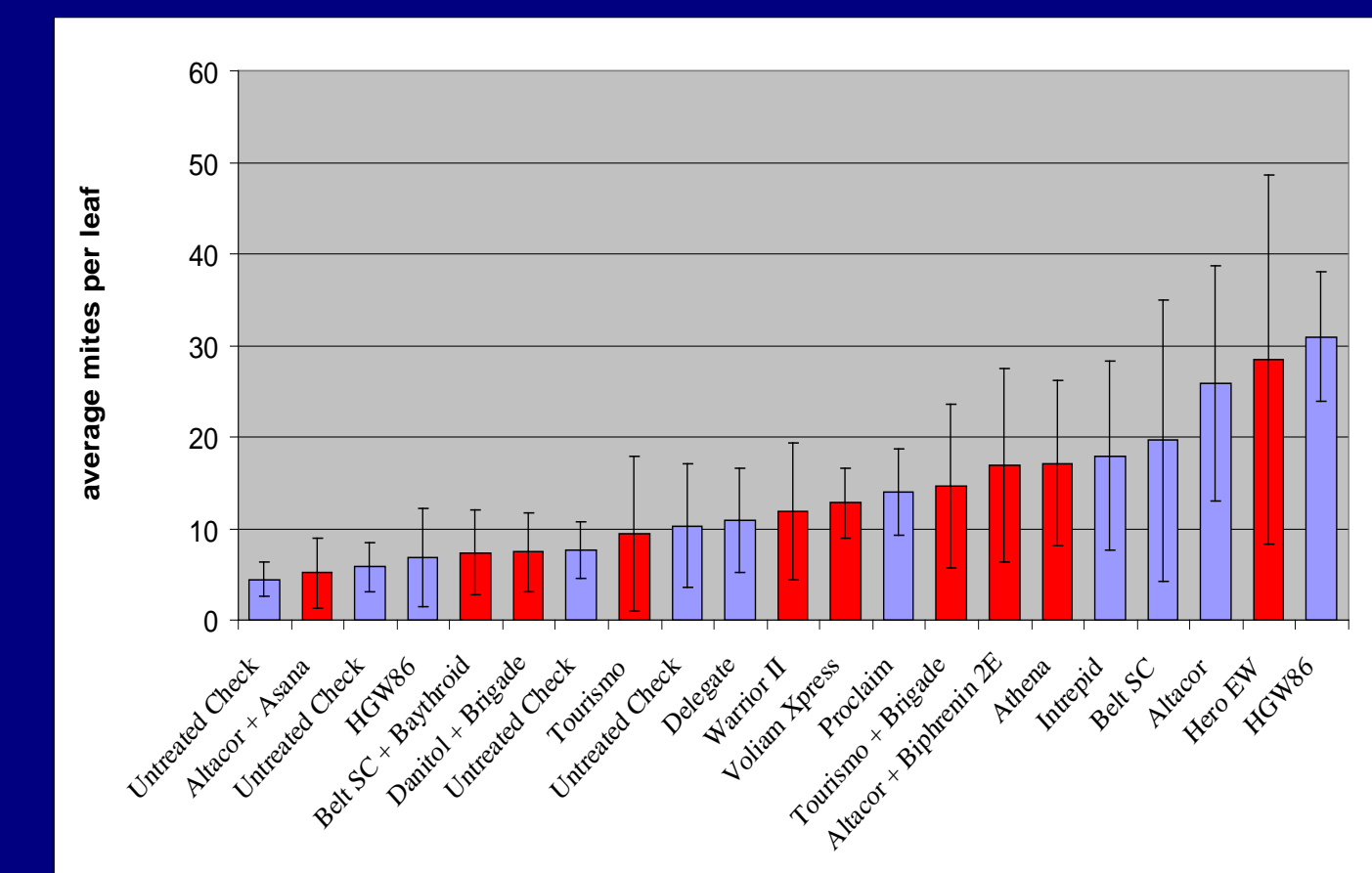
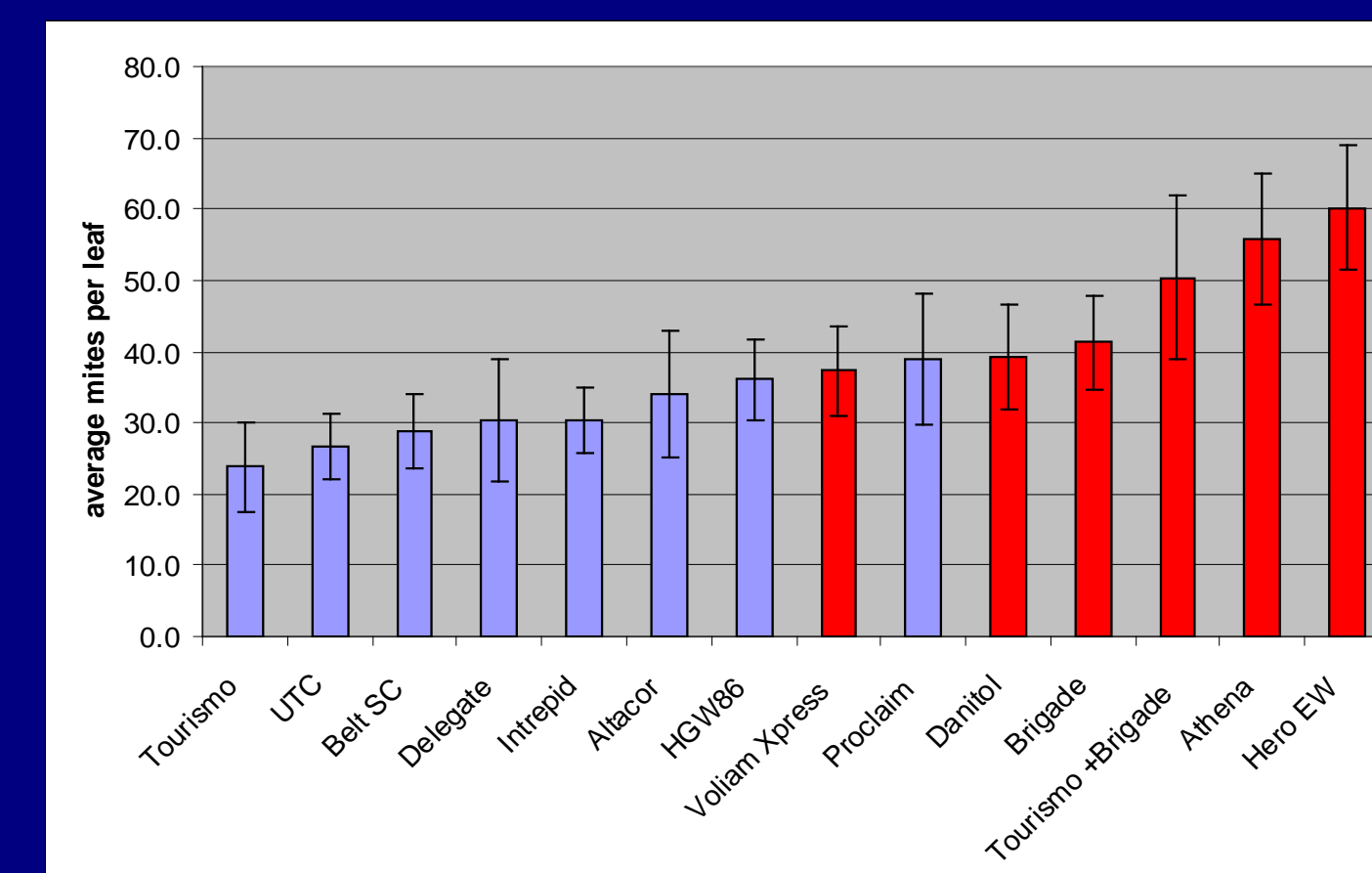


Figure 4 and 5. Affects of treatments for navel orangeworm on the spider mite density approximately 4 weeks after treatment. Bars in red indicate treatments including pyrethroids whereas blue bars indicate either the untreated check or plots treated with non-pyrethroid chemistries.

#### Acknowledgements:

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- We thank the almond growers throughout the state for funding provided by the Almond Board of California.
- Anybody with questions regarding this research and its results can contact David Haviland, UC Cooperative Extension, Kern Co., [dhaviland@ucdavis.edu](mailto:dhaviland@ucdavis.edu), 661 868-6200, or your local almond farm advisor.

## Navel Orangeworm cont.

In 2011, we conducted efficacy trials in Shafter, Five Points, and Parlier. Parlier consisted of a RCBD with 4 blocks of 13 treatments and an untreated check. Shafter and Five Points consisted of 6 blocks with 19 treatments and two untreated checks. Applications were sprayed during hull split on July 18<sup>th</sup>-19<sup>th</sup> in Shafter and July 25<sup>th</sup>-27<sup>th</sup> in Parlier and Five Points. Nuts were harvested from late Aug to early Sept. Evaluations are currently underway for all three trials. Results will be available in early spring 2012.

## Research Farms



The final purpose of this project is to establish two research orchards that can provide long-term benefit for almond research in the lower San Joaquin Valley (Table 1). As of fall 2011 these orchards have been used for more than 17 trials.

Table 1. Almond Orchard Specifications	
Shafter at the Shafter Research Farm	Five Points at the Westside Extension Center
<ul style="list-style-type: none"> <li>• 7 Acres with 720 trees</li> <li>• 50/50 ratio Nonpareil to Monterey</li> <li>• Spacing 20 ft x 22 ft</li> <li>• Micro-sprinklers - ability to irrigate Nonpareil and Monterey independently</li> </ul>	<ul style="list-style-type: none"> <li>• 5 Acres with 680 trees</li> <li>• Three varieties (Nonpareil, Carmel, and NePlus Ultra)</li> <li>• Spacing 15 ft x 20 ft</li> <li>• Drip irrigation</li> </ul>

The trials included three weed, one nutritional, one ant, seven spider mite, and five navel orangeworm trials that have been reported by various investigators to the almond industry.

