Pacific Spider Mite, Navel Orangeworm and Southern Fire Ant Control in the Lower San Joaquin Valley

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Pacific Spider Mite

Evaluation of miticides and additivies for their effects on Pacific spider mite

Introduction- Spider mite is a significant pest of almonds, especially late in the season during hot, dry weather as tree stress increases close to harvest. During 2012 we completed five replicated field trials in Shafter, CA to evaluate different aspects of spider mite control. The results of three of those trials are shown.

Miticide Screening Trial- We evaluated 14 miticides for their effects on mite density (Fig. 1) through 4 weeks after treatment. Significant reductions in mite density occurred for almost all miticide treatments, and were statistically equivalent or increased compared to the untreated check for pythrethroids (shown in red).

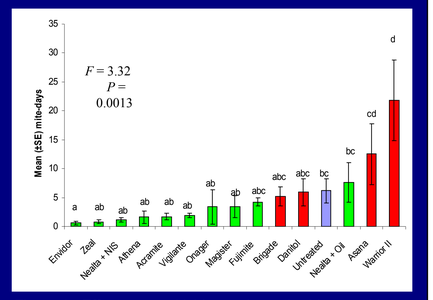


Figure 1. Effects new miticides and pyrethroids on spider mites compared to some miticide standards.

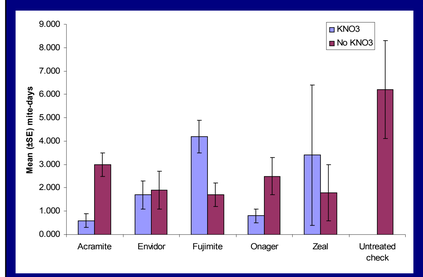
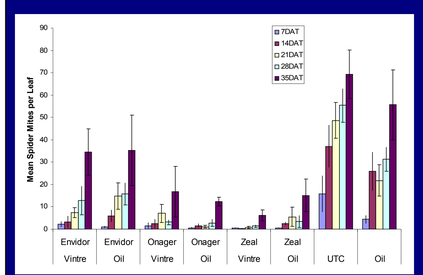


Figure 2. Effects of KNO_3 + 415° oil with five miticides on spider mite density.

Use of KNO3- Some growers have reported that they add potassium nitrate to the tank with miticides to help increase their efficacy. During trials in 2011 (not shown) and 2012 (Fig. 2) we did not see any clear trends suggesting that the use of potassium nitrate is increasing miticide efficacy.



Vintre as an additive- Due to inconveniences with using 415° oil and increasing costs per gallon of the product, many growers are looking for a more convenient, less expensive alternative to oil. During 2011 (Fig. 3) and 2012 (Fig. 4) we evaluated five miticides with Vintre as an alternative to 415° oil. In both years of the study plots treated with miticides + Vintre had similar mite densities as plots treated with the same miticides + 415° oil. This suggests that Vintre, with respect to efficacy, is an acceptable alternative to 415° oil.

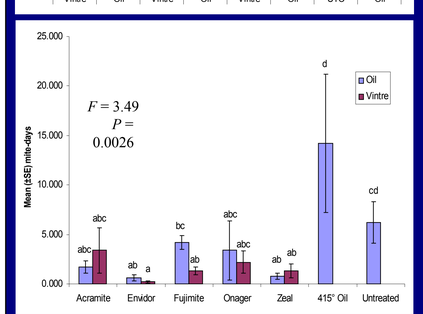


Figure 3,4. Effects of 415° oil and Vintre as adjuvants with five miticides on spider mite density.

Navel Orangeworm

Evaluation of insecticides for control of navel orangeworm at hull split

Introduction- Navel orangeworm is currently the most important pest of almonds in California due to its direct impact on the kernel and relationship with aflatoxins. Growers typically manage navel orangeworm through a combination of winter sanitation and one or more insecticide applications.

Each year we conduct a series of screening trials for insecticides for potential use against navel orangeworm. The primary goal is to determine the relative effectiveness of the insecticides so growers and researchers will know which products to use in larger scale field trials and commercial orchards.

Procedures- During 2011 and 2012 we conducted six screening trials for navel orangeworm. Trials were organized in a RCBD design with four to six replications of single-tree plots. Applications were made at hull split.

Mode of Action	Treatment/Formulation	Navel Orangeworm Damage (%)					
		Results by Treatment			Results by MOA		
		Parlier	Five Points	Shafter	Parlier	Five Points	Shafter
Anthranilic Diamide + Pyrethroid	Altacor WG35PC + Asana XL	N/A	0.00a	0.36	0.4 ± 0.3a	0.11 ± 0.04ab	0.16 ± 0.08
	Altacor WG35PC + Bifenthrin 2E	N/A	0.07ab	0.08			
	Belt SC + Baythroid XL	N/A	0.17abc	0.30			
	Tourismo + Brigade WSB	N/A	0.16abcd	0.07			
	Voliam Xpress	0.4	0.14abcd	0.00			
Pyrethroid	Athena	0.9	0.15abcd	0.07	0.6 ± 0.2ab	0.06 ± 0.03a	0.04 ± 0.03
	Brigade WSB	0.4	N/A	N/A			
	Brigade+ Danitol	N/A	0.08abc	0.00			
	Danitol 2.13EC	0.6	N/A	N/A			
	Hero EW	0.7	0.00a	0.08			
	Warrior II	0.6	0.00a	0.00			
Anthranilic Diamide	Altacor WG 35PC	0.7	0.71bcd	0.16	1.3 ± 0.4bc	0.35 ± 0.12bc	0.15 ± 0.06
	Belt SC	2.7	0.30abcd	0 00			
	HGW86 10SE	N/A	0.08ab	0.30			
	HGW86 10SE	1.0	0.21abcd	0.24			
	Tourismo	0.6	0.46bcd	0.07			
Other Larvicides	Delegate	0.8	0.15abc	0.07	1.1 ± 0.4abc	0.05 ± 0.05a	0.10 ± 0.06
	Intreprid	2.0	0.00a	0.07			
	Proclaim	0.7	0.00a	0.15			
Untreated Check	Untreated Check 1	2.3	0.48cd	0.15	2.3 ± 0.9c	0.54 ± 0.15c	0.32 ± 0.18
	Untreated Check 2	N/A	0.60d	0.50			
	F	1.67	1.67	0.92	3.11	4.35	1.05
	df	13, 42	18,95	18, 95	4, 15	4, 25	4, 25
	P	0.1035	0.0584	0.5571	0.0474	0.0083	0.4013

Results and conclusions. Results from three trials in 2011 (Table 1) and one of the 2012 trials (Fig. 5, 6) are presented in this poster. Results vary by trial, though trends occurred across trials when data were analyzed by mode of action. Generally speaking, diamides, pyrethroids and other larvicides (Delegate, Intrepid, Proclaim) all caused significant reductions in damage. The most effective treatments were usually tank mixes of a diamide with a pyrethroid. In each trial the best treatments provided approximately 60% reduction in damage.

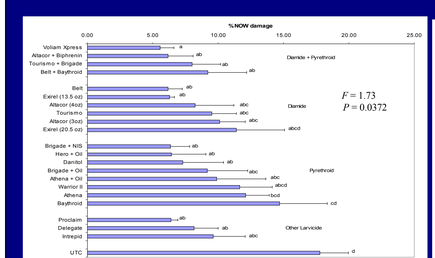


Figure 5. Effects of insecticide treatments on the percentage of kernels infested by navel orangeworm.

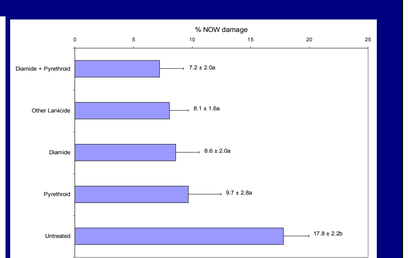


Figure 6. Effects of the mode of action of insecticides on the percentage of kernels infested by navel orangeworm.

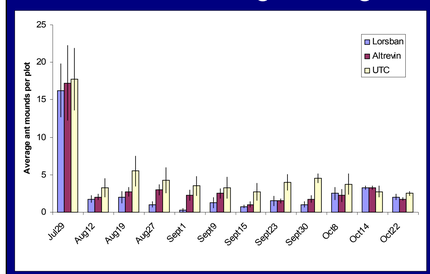
Southern Fire Ant

Evalution of a new ant bait, Altrevin, for fire ant control

Introduction- Almond growers currently rely on three ant baits for control of southern fire ant. This includes Clinch, Esteem and Extinguish. All three of these baits have been shown to be effective in field trials during the past decade, and all are easy to apply. However, the drawback to each of these baits is that they must be applied two to three months before harvest to give them time to work. This lag time for effectiveness has caused many growers to abandon UC-recommended sampling programs for fire ants and adopt calendar-based spray programs.

Recently a fourth ant bait called Altrevin was registered for use against southern fire ant in almonds. Based on work against red imported fire ant it is thought to be faster-acting than industry-standard baits, meaning that there might be the possibility of returning to threshold-based ant bait programs later in the season.

Procedures- During 2010 and 2012 we conducted small-scale ant bait trials in Shafter, CA, to evaluate the effectiveness of Altrevin. The trials were organized as a RCBD with 3 blocks of two treatments and an untreated check. Baits were applied 29 and 5 July, respectively, and ant density was evaluated for at least 2 months using hot dog bait vials and mound counts.



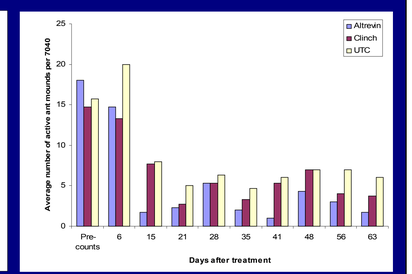


Figure 7 (2010) and 8 (2012). Effects of ant baits on the number of southern fire ant mounds per plot.

Results- During both years of the study Altrevin resulted in reductions in ant density within two weeks after treatment (Figures 7, 8). This confirmed that Altrevin can be relatively fast-acting compared to other commercial baits. Altrevin also resulted in reductions in ant density on most evaluation dates after application.

Conclusion- Data from our small-scale trial suggests that there is sufficient potential for use of Altrevin to justify the establishment of larger-scale research trials in commercial almond orchards. We are currently making plans to conduct this type of study during the 2013 season.

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- Anybody with questions regarding this research and its results can contact David Haviland, UC Cooperative Extension, Kern Co., dhaviland@ucdavis.edu, 661 868-6200, or your local almond farm advisor.