San Joaquin Valley Insecticide Efficacy Trials for Citrus Pests

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The purpose of this research program is to determine how insecticides can be used most effectively, with as little disruption of natural enemies as possible, as part of the citrus IPM program. Information derived from this project is used to update the UCIPM Pest Management Guidelines, produce Arthropod Management Test articles and help support registration of insecticides.

California red scale: During 2005, we studied the effects of two distillations (415, 455) of highly refined oils (Purespray 10E and 15E) as 0.8-1.2% sprays in 800 gallons of water per acre in a commercial citrus orchard. The Purespray 455 treatment resulted in significantly less scale per fruit compared to the Purespray 415 oil. The 1.2% Purespray 455 rate was more effective than the 0.8% rate. These results confirm previous studies that higher distillation points and higher percentages of oil cause more mortality of scale. During 2005, we also screened two new insecticides that are showing some efficacy against California red scale, but we do not have results to report because we have not completed this trial.

Citricola scale: VOC issues: During 2004, two trials compared the efficacy of the Lorsban 4E formulation with the Lorsban 75WG formulation. Cal EPA and the Air Resources Board are asking registrants to replace EC pesticide formulations with other formulations in order to reduce volatile organic compounds (VOCs) that are known to create ozone problems. The citrus industry needs to know if the replacement formulations are as effective as the EC formulations, because if they are not, then the change is likely to escalate pesticide use. Two months after treatment, the 4E formulation had a greater effect on lowering citricola scale density than the 75WG formulation. However, by the following spring the numbers of scale in the two treatments were virtually identical. These data suggest that the two formulations achieve the same level of control of citricola scale, however, the trial needs to be repeated in larger plots.

OP Alternatives/Trial 1: In late July 2004, we compared the efficacy of 12 pt of Lorsban, 2.86 lb of Applaud, and a combination of 6 pt Lorsban and 1.43 lb of Applaud for citricola scale control. The 12 pt rate of Lorsban was the most effective treatment, followed by the Lorsban combined with Applaud. Applaud alone did not reduce the scale sufficiently to keep it below the economic threshold the following spring (March 2005).

OP Alternatives/Trail 2**:** In September, we treated a heavily infested block at LREC with 6 pts Lorsban, 2 oz Assail, or 5.7 oz Assail with a speedsprayer. All treatments reduced citricola scale compared to the control. However, Lorsban was the most effective treatment, and 5.7 oz Assail was the next most effective treatment. Assail applied at 2 oz was not effective. None of the treatments provided a level of control that reduced citricola to levels below the economic threshold the following spring, demonstrating that heavy citricola scale populations are difficult to control long-term with any insecticide.

Conclusions: The reduced risk insecticides Assail and Applaud work more slowly against citricola scale compare to Lorsban and do not maintain citricola scale below the economic threshold for more than one year.

Katydid: We collected katydids from a stone fruit orchard and released them into 3-year-old citrus trees at LREC. We treated the trees with 2.5 oz Assail, 6.25 oz Micromite, or 3.125 oz Micromite combined with 0.5% oil. The chemicals took about a week to take effect. All treatments significantly suppressed katydids during the month after treatment. The Assail and the higher rate of Micromite were the most effective treatments in terms of reducing katydid numbers and reducing fruit scarring from 12% fruit in the control to <4% fruit damaged by katydids in the treatments.

Citrus red mite: In a 2005 field trial, we compared various rates of Nexter (Pyridaben), Onager (hexathiazox), Kanemite (acequinocyl), Agri-Mek (abamectin), and Envidor (spirodiclofen) with and without oil. All treatments reduced citrus red mite and predatory mite populations for 4 weeks. Table 1 shows the registration status of various miticides for bearing and nonbearing citrus.

Table 1. New miticides and their citrus registration status. All miticides have a 12 h REI.

Chemical	Formulation	Rate/100 gallons	Company	Registration Status	Reduced Risk
Fenpyroximate	FujiMite 5 EC	2 pts	Nichino	Unregistered	X
Bifenazate	Acraminte 50 WS	1 lb	Chemtura	Nonbearing	X
Etoxazole	Zeal 72 WAG Tetrasan*	3 oz	Valent	*Nonbearing	X
Acequinocyl	Kanemite 15 SC	31 oz	Arvesta	Bearing and nonbearing (oranges, grapefruit, lemons)	X
Spirodiclofen	Envidor 2 SC	13 oz	Bayer	Unregistered	
Hexythiazox	Savey 50 DF	2 oz	Gowan	Nonbearing	
Milbamectin	Mesa EC 1% Ultraflora	12 oz	Gowan	Unregistered	X
Pyridaben	Nexter	5.2-10.7 oz	BASF	Bearing and nonbearing	
Abamectin	Agri-Mek 0.15 EC	10 oz	Syngenta	Bearing only	

A number of new miticides are nearing registration. In our experience, some perform better against two-spotted spider mite and some perform better against citrus red mite. However, they all exert some level of control of mites in general. Since most are from different chemical classes, alternating use will help to reduce the rate at which mites develop resistance to any one.

Citrus Peelminer: Grapefruit, pummelo and susceptible navel varieties (Fukumoto, Atwood, TI) in Tulare County continue to suffer from heavy infestations of citrus peelminer. During 2005, we studied the effectiveness of a single (6.25 oz), double (3.125 oz) and triple (2 oz) application of Micromite against citrus peelminer in a pummelo orchard with and without a ground sulfur application. The percentage of fruit that was infested was reduced from 24% to 12% with two or three treatments of Micromite. Sulfur did not have an effect on peelminer in this orchard.