

Chemical Control/New Products

EFFECT OF ESTEEM ON SAN JOSE SCALE

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Abstract: The efficacy of Esteem and several other widely used insecticides on a heavy infestation of San Jose Scale was tested in a 'Braeburn' apple block. Applications were made by handgun to the point of drip. Treatments were a combination of materials at three possible timings: delayed dormant timing (DD) only, or DD plus an application aimed at 1st generation crawlers in midsummer. The 2nd spray targeting crawlers was timed using sticky tapes applied on limbs proximal to visible scale colonies. Fruit damage samples were done in midsummer and pre-harvest. All treatments, either single (DD) or double (DD and Gen. 1) applications, successfully reduced fruit infestation by scale compared to the check. Single applications of oil plus either Esteem or Supracide should be successful, although high populations may take several years to completely suppress.

Introduction

This test was conducted in a young 'Braeburn' orchard with a chronic scale infestation. The grower had never used oil in the delayed dormant, due to fear of cold injury, explaining perhaps why the infestation had reached the current level. Trees in the most heavily infested area were visibly encrusted with scale, and fruit had been moderately infested the previous season.

Materials and Methods

This experiment was conducted at the Dick Courtney Braeburn orchard above the lakes at Malaga. The experimental design was a randomized complete block with 7 treatments and 4 replicates. Treatments were randomized on the basis of location within the block. The second spray targeting crawlers was timed using sticky tapes applied on limbs proximal to visible scale colonies. The sticky tapes consisted of one-inch strips of masking tape closely applied to the bark and painted with Stikem Special™ Non-Poisonous Pest Glue (Seabright Laboratories, Emeryville, CA). Tapes were removed and examined weekly in mid-June in an attempt to identify peak crawler movement. Crawlers were identified during the third week in June and the second spray applied. Fruit damage was assessed by examining 25 fruits from the upper canopy and 25 fruits from the lower canopy on the middle three trees of each treatment. Treatments were applied at delayed dormant (5 April) and during first generation crawler movement (21 June). Sprays were applied with a handgun to drip using 200 gpa dilute to calculate the rate/volume water.

Data were analyzed using the Statistical Analysis System (SAS 1988). Data were tested prior to analysis for homogeneity of variance using Levene's (1960) test. Variances found to be non-homogeneous were transformed $[\ln(y+0.5)]$ before analysis. PROC GLM was used to conduct an analysis of variance, and treatment means were separated using the Waller-Duncan *k*-ratio *t*-test.

Results and Discussion

Fruit damage was high overall due to a variety of pests, however, ca. 50% of the untreated fruit were infested with scale (Table 1, Fig. 1). While all the treatments successfully reduced fruit infestation by scale in relation to the check, there were no consistent differences between treatments. In the Esteem DD treatment, fruit damage was very low in the midsummer damage assessment, but there is no logic (except variability and sampling error) to the higher levels of damage found in the Esteem DD & G1 treatment. The harvest sample (although differences among treatments are nonsignificant) indicates that oil alone may be a little weak in bringing a large scale infestation under control, but any of the treatments used were adequate. There is no reason to conclude from these data that a second application to the crawlers in late June was helpful in preventing fruit infestation, thus a single application at delayed dormant (oil plus either Supracide or Esteem) would suffice.

Codling moth damage was unusually high for a commercial orchard, and there were no differences among treatments. The grower was applying codling moth controls over the entire block, which would explain the lack of difference. However, the Esteem and Diazinon treatments during June might conceivably have been helpful in suppressing the latter half of the first generation (Table 2).

Thrips damage was high at the midsummer fruit evaluation (5-13%) but considerably lower at harvest (1-2.5%), probably due to hand thinning (Table 3). There were no differences among treatments, which were not expected to provide thrips control.

References Cited

- Levene, H. 1960.** Robust tests for equality of variances. Chap. 25. *In* Olkin, I., S. G. Ghurye, W. Hoeffding, W. G. Madow and H. B. Mann (Eds.), Contributions to probability and statistics. Stanford University Press, Stanford, CA.
- Statistical Analysis Institute. 1988.** SAS/Stat User's Guide, Release 6.03 Edition. SAS Institute, Inc., Cary, NC.

Table 1. Fruit damage due to San Jose scale, Malaga 2001

Treatment	Rate fm/ 100 gal	Timing	% fruit damage	
			26-Jul	11-Sep
Orchex 796	1.50%	DD	5.5 bc	8.5 b
Supracide 2E + Orchex 796	32 fl oz 1.50%	DD	6.0 bc	2.0 b
Esteem 0.86EC + Orchex 796	8 fl oz 1.5%	DD	1.5 c	6.0 b
Esteem 0.86EC + Orchex 796	8 fl oz 1.5%	DD	11.5 ab	3.5 b
Esteem 0.86EC + Orchex 796	8 fl oz 1.5%	Gen 1		
Supracide 2E + Orchex 796	32 fl oz 1.5%	DD	4.0 bc	5.0 b
Esteem 0.86EC + Orchex 796	8 fl oz 1.5%	Gen 1		
Supracide 2E + Orchex 796	32 fl oz 1.5%	DD	3.0 bc	4.0 b
Diazinon	2 lbs	Gen 1		
Check	.	.	45.5 a	55.0 a

Means within columns not followed by the same letter are significantly different (Waller-Duncan *k*-ratio *t*-test, *k*-ratio=100).

Timing: DD = 5 April 2001, Gen 1 = 21 June 2001.

Table 2. Codling moth fruit damage midsummer and harvest, Malaga, 2001

Treatment	Rate fm/ 100 gal	Timing	CM Entry		CM Sting	
			26-Jul	11-Sep	26-Jul	11-Sep
Orchex 796	1.5%	DD	8.0 a	8.0 a	5.5 a	4.0 a
Supracide 2E + Orchex 796	32 fl oz 1.50%	DD	5.5 a	6.5 a	4.0 a	3.0 a
Esteem 0.86 EC + Orchex 796	8 fl oz 1.5%	DD	7.5 a	5.5 a	3.5 a	4.0 a
Esteem 0.86 EC + Orchex 796	8 fl oz 1.5%	DD	8.0 a	8.0 a	3.0 a	3.5 a
Esteem 0.86 EC + Orchex 796	8 fl oz 1.0%	Gen 1				
Supracide 2E + Orchex 796	32 fl oz 1.5%	DD	5.0 a	4.5 a	3.0 a	2.0 a
Esteem 0.86 EC + Orchex 796	8 fl oz 1.0%	Gen 1				
Supracide 2E + Orchex 796	32 fl oz 1.5%	DD	4.5 a	3.5 a	5.5 a	4.0 a
Diazinon 50WP	2 lb	Gen 1				
Check			6.5 a	8.0 a	9.5 a	2.5 a

Orchex rate is in percentage vol:vol.

Timing: Delayed dormant, 5 April; 1st generation crawlers, 21 June.

Table 3. Fruit damage due to thrips damage at Malaga site

Treatment	Rate fm/ 100 gal	Timing	% fruit damage	
			26-Jul	11-Sep
Oil	1.5%	DD	7.0 a	1.5 a
Supracide 2E + Orchex 796	32 fl oz 1.5%	DD	9.0 a	1.5 a
Esteem 0.86EC + Orchex 796	8 fl oz 1.5%	DD	8.0 a	2.0 a
Esteem 0.86EC + Orchex 796	8 fl oz 1.5%	DD	7.0 a	2.5 a
Esteem 0.86EC + Orchex 796	8 fl oz 1.5%	Gen 1		
Supracide 2E + Orchex 796	32 fl oz 1.5%	DD	5.5 a	1.5 a
Esteem 0.86EC Orchex 796	8 fl oz 1.5%	Gen 1		
Supracide 2E + Orchex 796	32 fl oz 1.5%	DD	13.0 a	2.5 a
Diazinon	2 lbs	Gen 1		
Check	.	.	10.0 a	1.0 a

Means within columns not followed by the same letter are significantly different (Waller-Duncan *k*-ratio *t*-test, *k*-ratio=100).

Timing: DD = 5 April 2001, Gen 1 = 21 June 2001.

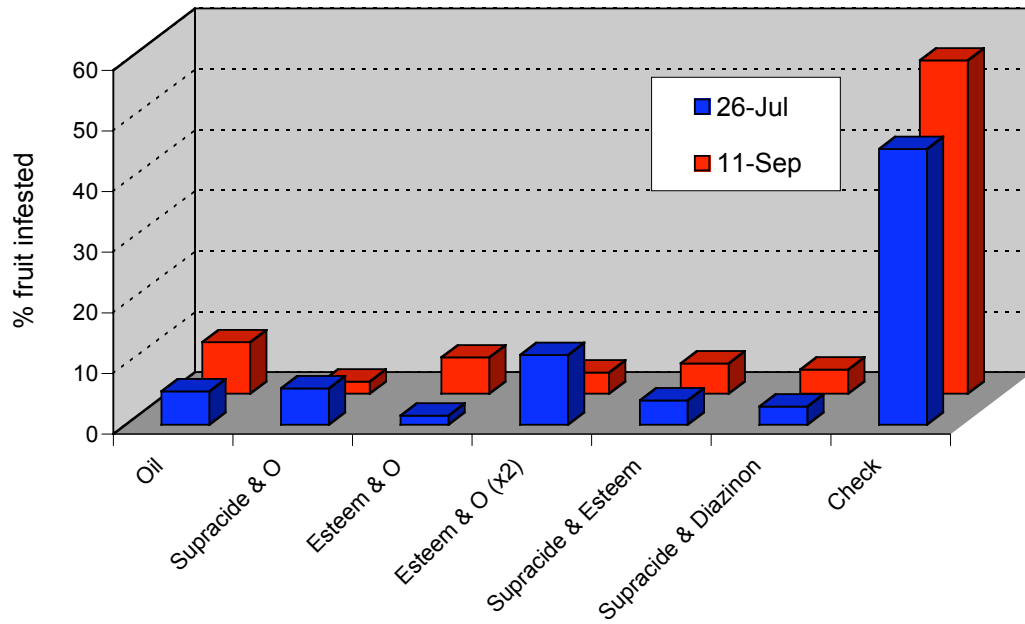


Figure 1. Fruit damage by San Jose scale, Malaga, 2001.