

Chemical Control/New Products

Dilute vs. Concentrate Spray Applications for Control of San Jose Scale

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A mature orchard of Fantasia nectarines at the Kearney Agricultural Center was used for a dilute dormant spray at 400 gal/acre compared to a concentrate dormant spray application at 100 gal/acre for control of San Jose scale. This orchard (approximately 20 years old) had been treated with a dormant spray program using oil and Kocide at 100 gal/acre for at least the previous three years; organophosphate insecticides were not included. During this time, increasing levels of San Jose scale had been observed on harvested fruit. Consequently, the orchard had a relatively high resident population of scale throughout the orchard. In both the dilute and concentrate spray treatments, diazinon 50 wettable at 2 lb a.i./acre was applied in combination with Volck Supreme oil at 6 gal/acre and Kocide at 2.5 lb/acre using an Air-O-Fan GB-35 sprayer. Both spray treatments were applied on January 29, 1996, in a randomized complete block design of five replications per treatment, nine trees (3 x 3) per replicate. The two spray treatments were compared to an untreated check in the same orchard. Fruit was harvested on July 10, 1996, by randomly selecting 200 fruit per replication (1,000 fruit per treatment) for direct examination of scale infestation. In these treatments, the presence of a single scale on a fruit resulted in that fruit being scored as infested. No attempt was made to count the total number of scales present on each piece of fruit.

The fruit infested by scale at harvest are shown in Table 1 which indicates that there were no statistically significant differences between the untreated check and the two treatments with diazinon and oil applied on January 29. It was surprising in fact to see that both of the insecticide treatments were actually slightly higher in scale infestation levels than the untreated check. The results of this field trial confirm the conclusions reached with the laboratory studies on San Jose scale resistance: field populations of scale have developed high levels of resistance to organophosphate insecticides.

Along with the infested fruit data from this trial, crawler populations of scale were monitored in each treatment by placing two sticky-tape crawler traps on the upper scaffold limbs in the center tree of each replicate. Two counts of the tapes at weekly intervals were made at the peak of the first, and again at the second, generation of scale crawlers in May and July. The crawler populations observed in the three treatments using sticky tapes are shown in Table 1 and indicate that there were no significant differences in crawler populations between the untreated check and the dilute diazinon treatment while the concentrate diazinon treatment had a much higher population of crawlers in both generations. Although the amount of infested fruit at harvest in the concentrate treatment was only slightly higher than the dilute application and check, the data from the tapes in the concentrate treatment tend to support the hypothesis that concentrate spray applications in old mature trees often may not produce the level of scale population reduction observed with dilute applications of the same insecticide.

Table 1. Efficacy of dormant dilute and concentrate sprays of diazinon and oil for control of San Jose scale on Fantasia nectarines, January 29, 1996, Kearney Agricultural Center, Parlier.

Treatment	% infested fruit ²	Average number crawlers/tape	
		1st generation	2nd generation
Check	32.3a	24.4a	40.6a
Diazinon ¹ 400 gpa	37.0a	32.6a	42.2a
Diazinon ¹ 100 gpa	37.3a	144.4b	149.2b

¹2.0 lb a.i. diazinon and 6.0 gal Volck oil per acre.

²July 10, 1996; 1,000 fruit per treatment. Values in columns followed by the same letter are not significantly different at $P = 0.05$, Fisher's Protected LSD.