

Chemical Control/New Products

Managing San Jose Scale with Mineral Oils in Plums

Walt Bentley, Dick Rice, Kevin Day and Carlos Hernandez
University of California Kearney Agricultural Center, Parlier, CA

Keywords: San Jose scale, *Quadraspidiotus perniciosus*, mineral oil, Applaud, buprofezin, Esteem, pyriproxyfen, Diazinon, Volck Supreme oil, Orchex, plum

A block of mixed Black Amber and Queen Rosa plums was treated on February 10, 1999, with a 400 gal mixture of either Volck Supreme Oil (8 gpa), Orchex 692 Narrow Range Oil (8 gpa) or left untreated. These treatments were replicated three times and applied to 64 tree plots. Treatment effects were measured by randomly sampling 200 fruit from each plot at harvest during July and evaluating San Jose scale infestation.

San Jose scale infestation at harvest of the Black Amber (7/3) and Queen Rosa (7/7) resulted in significantly ($P < 0.05$, Fisher's Protected LSD) less scale infested fruit by the Volck Supreme and Orchex 692 applications when compared to the untreated check. For the Black Amber cultivar, the Volck Supreme treatment averaged 1.25%, the Orchex 692 treatment averaged 1.50% and the untreated plums averaged 10.75% at harvest on July 3 (Table 1). For the Queen Rosa, the Volck Supreme treatment averaged 4.19% infested fruit, Orchex 692 averaged 4.83% and the untreated control averaged 14% (Table 1).

A second trial was performed on a mixed block of Royal Diamond and Rosemary plums. In February 1998, four insecticide treatments were applied to 30 tree plots. Materials used were Applaud 70W (1.5 lb/acre), Esteem 2.9 EC (0.1 lb/acre) or Diazinon 50WP (2.0 lb/acre). Each material was applied with 6 gal of Volck Supreme oil in a dilution of 400 gpa. The fourth treatment consisted of Volck Supreme applied alone at the rate of 6 gpa in 400 gal of mixture. These treatments resulted in varying and significantly different infestations of San Jose scale at harvest (Table 2). On February 10, 1999, the 1998 treated areas were divided in half and treated with either Volck Supreme Oil (8 gpa) or Orchex 692 Narrow Range Oil (8 gpa). This was applied in a mixture of 400 gpa with a high volume air carrier sprayer, driven at 2 mph. Treatments were replicated three times. An analysis of variance on infestation (400 plums/treatment) using a split plot design was performed, the main treatments being the 1998 scale populations and the subplot treatments being the 1999 oil spray.

Where treatments were applied to the late harvested mixed block of Royal Diamond and Rosemary cultivars, there was significant interaction between the previous year's population and the effect of oil on San Jose scale infestation, when the infestation of each sample was combined. Table 2 presents infestation at harvest for the main plot (1998) and infestation at harvest for the subplot (1999). Table 3 presents influence of the 1998 treatments (main plot effects) on scale populations, showing significant differences ($P < 0.05$) in infestation based on treatment in 1998. The plots with the lowest San Jose scale infestations (Applaud and Esteem) in 1998 also had fewer scale infested fruit in 1999 when compared to the plots with the highest scale infested fruit in 1998 (Diazinon and oil alone). In analyzing the subplot oil treatments on the combined

infestation of Royal Diamond and Rosemary plums, Volck Supreme Oil treated trees (4.9% infested fruit) had significantly ($P < 0.05$, Fisher's Protected LSD) less scale than the Orchex 692 sprayed trees (6.23% infested fruit).

Table 1. Influence of two dilute oil sprays (2/15/99) on San Jose scale infestation of two plum cultivars.

Treatment	Rate/acre	Black Amber (7/3)		Queen Rosa (7/7)	
		% infested	# of SJS	% infested	# of SJS
Untreated	--	10.75 b	16.00 b	14.00 b	29.17 b
Volck Supreme	8 gal/400	1.25 a	1.25 a	4.91 a	8.92 a
Orchex 692	8 gal/400	1.50 a	1.75 a	4.83 a	8.00 a

Table 2. Average % infestation of San Jose scale infestation on Royal Diamond and Rosemary plum (combined), August 1998 and 1999.

1999 Treatment	Average % infestation	
	1998 + 6 gal Volck	1999 1998
Orchex 692, 8 gal	Applaud 70W, 1.51b	3.25 ---
Volck Supreme, 8 gal	Applaud 70W, 1.5 1b	3.66 1.80 a
Orchex 692, 8 gal	Esteem 2.9EC, 0.1 lb	6.33 ---
Volck Supreme, 8 gal	Esteem 2.9EC, 0.1 lb	1.58 10.00 a
Orchex 692, 8 gal	Diazinon 50WP, 2.0	9.00 ---
Volck Supreme, 8 gal	Diazinon 50WP, 2.0	8.33 31.20 b
Orchex 692, 8 gal	---	6.33 --
Volck Supreme 8 gal	---	6.16 44.15 c

Table 3. Average % infestation of San Jose scale infestation on Royal Diamond and Rosemary plum (combined), August 1998 and 1999.

1998 treatment + 6 gal Volck	Average % infestation	
	1998	1999
Applaud 70W, 1.5 lb	1.80 a	3.45 a
Esteem 2.9EC, 0.1 lb	10.00 a	3.95 a
Diazinon 50WP, 2.0	31.20 b	8.67 b
Control	44.15 c	6.25 ab

Table 4. Average % infestation of San Jose scale infestation on Royal Diamond and Rosemary plum (combined), August 1999.

1999 oil treatment	Average % infestation
	1999
Volck Supreme, 8 gal	4.9 a
Orchex 692, 8 gal	6.23 b