

Section 4: Chemical Control/New Products

Chemical Control of Grape Mealybug In Table Grapes

Walt Bentley

Kearney Agricultural Center, 9240 South Riverbend Avenue, Parlier, CA 93648

Two field trials were performed in 1996 to evaluate the effectiveness of imidacloprid (Provado®) and calcium polysulfide (lime/sulfur solution) for control of grape mealybug, *Pseudococcus maritimus* (Ehrhorn) in table grapes. The insecticides were compared to the standard spring application of chlorpyrifos (Lorsban® 4E) plus Safetycide oil applied in mid March.

The first trial was established on a 120 acre Ruby Seedless vineyard with a serious mealybug infestation. Treatments were applied to 1.6 acre plots replicated 3 times. Two timings were used, a fall timing applied on October 25, 1995 (200 gpa) and a spring timing applied on March 18, 1996 (200 gpa). The fall treatments included; 1. Lorsban 4E (8 pints) plus Safetycide oil (4 gallons), 2. Provado (1 ounce), and 3. lime/sulfur (10 gallons). The canes were cut to approximately shoulder height prior to treatment to enhance coverage of the vine interior. The spring treatments included; 1. Lorsban 4E (4 pints) plus Safetycide (4 gallons) and 2. Provado (1 ounce). There was also an untreated control. The applications were made with a U shaped, over the vine sprayer traveling at 2 mph. Evaluation of treatment effects was made by a 10 minute timed count of 4 spurs on each of 8 vines per plot (a total of 24 vines and 96 spurs per treatment) on May 22, 1996. The mean number of spurs infested per plot were as follows: **24.8** for the untreated, **19.2** for the lime/sulfur on 10/25, **20.8** for the Lorsban 4E plus oil on 10/25, **21.6** for the Provado on 10/25, **1.6** for the Lorsban 4E plus oil on 3/18, **17.6** for the Provado on 3/18. The spring application of Lorsban 4E plus oil was significantly different from all treatments ($P < 0.05$; Fisher's Protected LSD). The number of mealybugs/32 spurs were as follows: **72.3** for the untreated , **57.7** for the lime/sulfur on 10/25, **48.3** for the Lorsban 4E on 10/25, **65.0** for the Provado on 10/25, **1.7** for the Lorsban 4E on 3/18, **54.0** for the Provado on 3/18. The spring application of Lorsban 4E plus oil was significantly different from all treatments ($P < 0.10$; Fisher's protected LSD). Table 1 presents these results.

Table 1. The effects of various insecticide applications on control of grape mealybug in Ruby Seedless table grapes, McFarland, CA, May 22, 1996.

Treatment	A.I./acre	Application Date	# Infested spurs per 32!	# Mealybug per 32 spurs*
Untreated	-	-	24.8a	72.3a
Lime/sulfur	30.74	10/25/95	19.2a	57.7a
Lorsban + Oil	8 lb + 4 gal	10/25/95	20.8a	48.3a
Provado	0.05 lb	10/25/95	21.6a	65.0a
Lorsban + Oil	4 lb + 4 gal	3/18/96	1.6 b	1.7 b
Provado	0.05 lb	3/18/96	17.6a	54.0a

! Means followed by the same letter are not significantly different ($P < 0.05$; Fisher's Protected LSD test).

* Means followed by the same letter are not significantly different ($P < 0.10$; Fisher's Protected LSD test).

The second trial was also performed to an 8 year old Ruby Seedless vineyard. Single row treatments (75 vines/row) were made with a U shaped, over the vine boom at 2 mph and 460 psi.

Treatments were replicated 4 times. Treatments included; 1. Lorsban 4E applied at 4 pts/acre in 270 gallons of spray mix on 3/9/96, 2. Provado applied at 1 ounce/acre in 270 gallons of spray mix on 3/9/96, 3. Lime/sulfur applied at 10 gallons/acre in 270 gallons of spray mix on 3/9/96, 4. Provado applied at 1 ounce/acre in 135 gallons of spray mix on 7/5/96, and 5. an untreated check. Evaluation of treatment effects were made by counting infested spurs and infested bunches.

On 5/9/96 a ten minute search of four spurs per vine on each of 12 vines per plot was done. Both the mean number of spurs infested and the mean number of mealybugs per 48 spurs searched are shown in Table 2. The mean number of infested spurs per 48 searched were **14.5, 9.5, 7.8, and 1.0** for the March timings of the untreated, lime/sulfur, Provado, and Lorsban, respectively. The Lorsban treatment was significantly different from each of the other treatments ($P < 0.05$; Fisher's protected LSD). Also the Provado treatment was significantly different from the untreated, but not the lime/ sulfur treatment ($P < 0.05$; Fisher's protected LSD). The lime/sulfur treatment was not different from the untreated. The mean number of mealybugs per 48 spurs were **29.5, 17.3, 11.8, and 1.0** for the March timings of the untreated, lime/sulfur, Provado, and Lorsban, respectively.

At harvest, on 8/22/96, 20 bunches lying against the trunk of different vines, in each plot, were evaluated as to the presence or absence of mealybug. The results of the harvest infestation are shown in Table 2. The 3/9/96 Lorsban treatment was significantly less infested than the other treatments ($P < 0.01$; Fisher's protected LSD). There was no difference infestation between the other treatments.

Table 2. The effects of various insecticide applications on control of grape mealybug in Ruby Seedless table grapes, McFarland, CA, 1996.

Treatment	A.I./acre	Infested spurs/48 (5/9)!	Mealybugs/4 8 spurs (5/9)!	Infested bunches/20 (8/22)*	Infestation Rating (0-3) (8/22)
Untreated	-	15.5 c	29.5 c	17.0 b	1.7
Lorsban 3/9/96	4 lb	1.0 a	1.5 a	5.5 a	1.1
Lime/sulfur 3/9/96	30.74	9.5 bc	17.3 b	14.8 b	1.7
Provado 3/9/96	0.05 lb	7.8 b	11.8 ab	14.0 b	1.6
Provado 7/5/96	0.05 lb	-	-	13.0 b	1.2

! Means followed by the same letter are not significantly different ($P < 0.05$; Fisher's Protected LSD test).

* Means followed by the same letter are not significantly different ($P < 0.01$; Fisher's Protected LSD test).

The results of these two trials indicate that the March application of Lorsban reduces infestation better than the comparison treatments. Of note is the lack of success with the fall treatment timing of Lorsban at the 2X rate, it being no different from the untreated check as shown in table 1. A spring or summer treatment using Provado will not replace the spring Lorsban treatment for controlling grape mealybug in table grapes. Although once used for mealybug control, lime/sulfur applications did not reduce spur or bunch infestation in these trials.