Grape Mealybug Control Trial 2008

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Test Location: Kendall Jackson Fulton Road Ranch

Test Crop: Grapes:
Vitis vinifera L. Chardonnay clone 4
Vitis vinifera L. Pinot Noir clone Gamay
AXR rootstock, planted in 1980 at 8 ft vine X 12 ft row spacing (454 vines per acre)

Species targeted: Grape mealybug, *Pseudococcus maritimus*

Products Tested: Applaud 70DF® – Buprofezin
Actara® – Thiamethoxam
Venom® – Dinotefuran
Movento 240 SC® – Spirotetramat

Experimental Design: Five treatments were replicated five times in a randomized complete block design. Each replicate (plot) encompassed five treated vines; three data vines in the center of the plot and one buffer vine on either side.

Summary: Insecticide applications of four products were applied to target first instar nymphs (crawlers) grape mealybugs on wine grape vines. Applaud® was applied at bottom label rate. Actara® and Venom® were applied at top label rate. Movento® was not registered at the time of application and was applied at a rate below published label rates once registration was granted.

At harvest, vines treated with Movento® had significantly fewer mealybugs per cluster than the control vines. No significant difference existed in mealybugs per cluster between vines treated with Applaud®, Actara®, Venom® and the control.

Treatment Timing and Rates:
Single applications of four different insecticides were sprayed to target overwintering grape mealybug crawlers. Applaud®, Actara® and Venom® were applied on April 26th before the current season growth had exceeded 15 cm. Movento® application was delayed three weeks to May 17, at which time the canopy had expanded for sufficient foliar absorption of Movento® (Table 1).

The top of label rate was chosen for Venom®, as previous trials indicated lower rates did not provide adequate control. UCCE Sonoma had no prior trial data for Actara® and top of label rates were chosen for this product. The bottom of label rate was selected for Applaud®, as this rate had been effective in previous UCCE trials. Movento® had not been granted registration at the time of application and was sprayed at a low rate that had demonstrated efficacy in a previous trial. The product was registered during the growing season and published label rates were higher than the rate sprayed.

Table 1. Treatment rate and application timing

		Applaud®	Actara®	Venom®	Movento®[1]	Control
Date	Gallonage	----------rate----------				
	gal ac^{-1}	----------oz ac^{-1}----------				
4/26/2008	50	12.0	3.5	3.0	-	-
5/17/2008	50	-	-	-	5.0	-

[1]Movento® was applied with Latron B-1956 0.25 % sticker spreader

Application Equipment:
Foliar sprays were applied with backpack pump sprayer.

Evaluation Procedures
To select 5-vine plots in which all vines contained grape mealybugs, a pre-count was made on each vine in two rows separated by a buffer row on April 18. Spurs on five arms on each vine were examined for presence - absence of grape mealybug. Contiguous five-vine sets with mealybugs present on spurs were selected into a pool of possible plots. Treatments were assigned to plots in a randomized complete block design. The center three vines of each plot were considered data vines and the two vines on either side were considered buffer vines.

Mealybugs were counted in clusters September 15-20, the week prior to commercial harvest. Ten clusters were removed from each of the three data vines per plot, placed in labeled paper bags and transported to the laboratory in coolers. Selection priority was given to clusters touching the cordons. In the event that no clusters touched the cordons, the most basal clusters were selected. The cluster sampling process occurred over the course of five days, therefore treatments were harvested and mealybugs counted by replication.

In the laboratory, clusters were clipped apart with small scissors. Dissecting microscopes and mechanical counters were utilized to count all life stages. Most mealybugs were females and nymphs, however only the total number per cluster was recorded (Table 5).

Statistical Analysis:
Treatment effects on mealybugs per cluster were analyzed using ANOVA. Tukey's HSD procedure was used to detect treatment differences.

Results and Discussion:
Movento® was the only product tested that significantly reduced mealybug populations in clusters at harvest α=0.05 (p=0.0018). Applaud®, Venom® and Actara® appeared to reduce mealybug populations, however Tukey's HSD revealed no significant difference between these treatments and the control (α=0.05) (Figure 1).

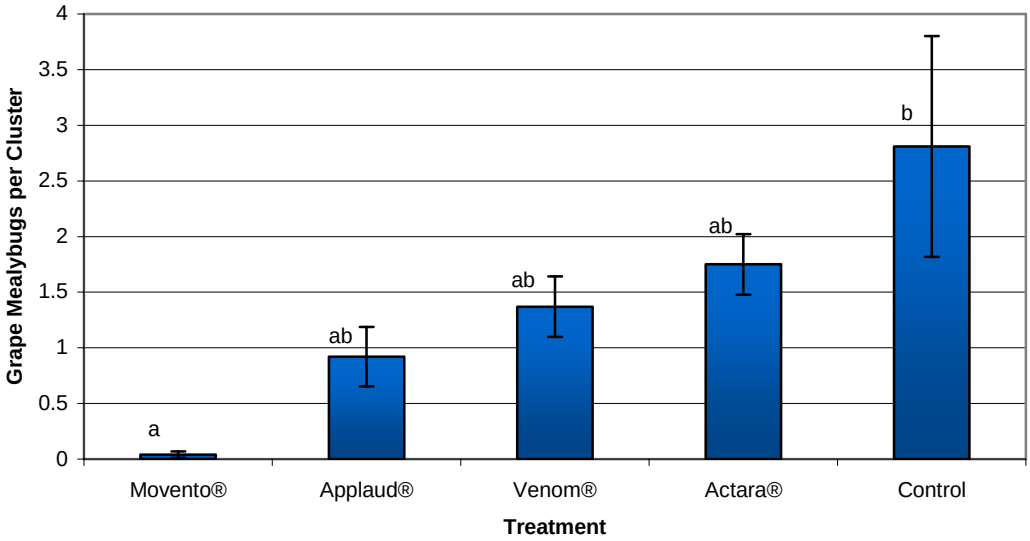

Figure 1. Average number of grape mealybugs per cluster at harvest

Although it appears the number of mealybugs in clusters on vines treated with Movento was significantly fewer than on vines which received other products, a large number of zero values in clusters on all treated vines caused a similar treatment effect (Table 2).

Table 2. Average number of grape mealybugs per cluster at harvest

Treatment	Mean	Standard Error	Tukey's HSD
Movento®	0.04	0.0296	a
Applaud®	0.92	0.2670	ab
Venom®	1.37	0.2710	ab
Actara®	1.75	0.2725	ab
Control	2.81	0.9920	b

Conclusion:
One early-season, low rate application of Movento® proved effective for significantly reducing grape mealybug populations in winegrapes. Application timing of Movento® is critical for mealybug control. The product must be applied when the canopy is sufficiently expanded for foliar absorption, but well before adults develop. Due to high population variability no significant difference was observed with Applaud®, Venom® and Actara® at the rates tested