University of California
Agriculture and Natural Resources

Cooperative Extension-Sacramento County
4145 Branch Center Road, Sacramento, CA 95827-3823
(916) 875-6913 Office • (916) 875-6233 Fax
Email: caingels@ucdavis.edu
Website: http://cesacramento.ucdavis.edu

Tree and Vine Newsletter

Chuck Ingels, Pomology/Viticulture Farm Advisor

January 2012

Integrated Pest Management for Vine Mealybugs in Wine Grapes

by Chuck Ingels, David Haviland[1], and Steve Quashnick[2]

Vine mealybug (*Planococcus ficus*) infestations continue to increase in northern San Joaquin Valley vineyards, and their presence has led to greater reliance on insecticides and disruption of successful IPM programs. Several strategies can be employed, with non-chemical methods important but insecticides being most effective; several newer insecticides are safer and less harmful to beneficials than organophosphates. Although more vineyards are becoming infested, populations within infested areas are declining because the judicious use of insecticides has successfully lowered mealybug populations in areas that are infested.

Cultural Control. Cultural controls are the primary means of preventing mealybug spread. The female mealybug is unable to fly so it must be carried by humans, equipment, or birds. When planting new vineyards be sure to use certified plants. Do not allow contaminated equipment, vines, grapes, or winery waste near uninfested vineyards. Movement of equipment that pushes brush or any over-the-row equipment can be a major source of infestations in new locations, so steam sanitize equipment before moving to uninfested portions of the vineyard. Do not spread infested cluster stems or pomace in the vineyard unless they have been covered with clear plastic for several weeks. Also, clusters that hang on the bark are much more susceptible to attack by vine mealybug, so any practice that increases that amount of fruit that is free-hanging will assist in mealybug control.

Biological Control. The use of the parasite *Anagyrus pseudococci* has provided up to 90% parasitism in the San Joaquin Valley. Parasitism rates can be improved by releasing them early in the season. Promoting parasites is very important because they are active late in the growing season and can reduce vine mealybug populations before the pest begins to move to the lower part of the trunk after harvest. Ants must be controlled to keep them from interfering with these natural enemies. Also, biological control is greatly hindered by disruptive pesticides. Products such as Movento, Applaud and the soil applied neonicotinoids offer good mealybug control without disrupting parasitoid populations.

Mating Disruption. In research led by Kent Daane over the past few years in the San Joaquin Valley, mating disruption significantly reduced pheromone trap catches. However, traps were not "shut down", as often happens with moth insects, probably because of the large number of mealybug males in the vineyard and their poor flight, which may result in males blown by the wind near the pheromone traps and then moving into the trap once in the vicinity. Also, in some trials there was a late summer increase in males caught, suggesting that more work still needs to be done to increase the longevity of dispensers that are currently available.

The effectiveness of mating disruption likely depends on many factors, including pest density. In areas with very low mealybug density male mealybugs most likely require the use of pheromones to locate the females. However, when pest densities are high the reliance on pheromones is likely negligible for a male that only needs to walk a centimeter to find a mate. Due to the fact that mealybug distribution is highly clumped in most vineyards (lots of vines with no mealybugs and a few vines with lots

of mealybugs), mating disruption is an option that can be included as part of a mealybug management program, but that is unlikely to ever become a stand-alone option for control. To date, the most successful uses of mating disruption have been to use chemical control to clean up a vineyard, and then use mating disruption in combination with other insecticides for long-term maintenance. However, mating disruption has not gained in the widespread acceptance because of high cost and the continued need for insecticide treatments.

Chemical Control. Season-long control programs for vine mealybug are typically comprised of a combination of insecticide treatments assisted by biological control. Possible insecticide options include Lorsban as a delayed-dormant application to the trunk just before bud break, one or two applications of Applaud in the spring when crawlers are moving up the trunk, soil applications of neonicotinoids during bloom, applications of Movento from April through June, and late-season foliar sprays of contact materials like Clutch or Assail. Management programs for wine grapes in the San Joaquin Valley typically include one to three of these options in any given year.

Lorsban and other generic products containing chlorpyrifos can be applied as delayed-dormant or postharvest treatments that also can help control ants. The delayed dormant treatment occurs when most of the mealybug population is still below ground under the bark, and the young are killed as they move up the vine in the spring; control levels have been reported as high as 90% of the population. In five field studies conducted by Haviland in Kern County table grapes from 2008 to 2011 delayed-dormant applications of Lorsban provided an average reduction of 46.3% in the number of mealybugs per vine during 3-minute timed searches in June and a 69.2% reduction in the percentages of clusters with honeydew or mealybugs in July.

As a postharvest application, Lorsban has been used to kill mealybugs before they are able to return below ground for the winter. This practice has been used for several years, but is becoming less common. This is because recent research in Kern County has shown that post-harvest treatments with Lorsban are not effective, label changes now mandate only one application of Lorsban per season (making delayed-dormant treatments a much better option that postharvest treatments), and because of concerns that this timing may severely impact beneficials, especially parasitoids, which are in the period of highest densities in late summer.

Movento (spirotetramat) is a lipid biosynthesis inhibitor that has been shown to be highly effective when applied in spring or postharvest, and it is safe to beneficials. Nearly a dozen trials in Kern County have shown that Movento can be effective any time from April through June. In the same five trials previously referenced for Lorsban, applications of Movento in April, May, and June led to reductions in the percentage of clusters with mealybugs by 89.6, 74.2 and 80.1%, respectively, in July. Key factors related to Movento are that it must be used with a surfactant, coverage must be sufficient to cover the leaves but not allow runoff, and the product must be used with a period of at least 8 weeks between the application and harvest to give it time to work. After application, Movento moves systemically in both the phloem and xylem and must be ingested by a mealybug, which then dies within a few days (crawlers) to several weeks (adult females) due the inability to generate new energy reserves. Postharvest Movento applications have been used very effectively in table grapes, and to some extent in wine grapes. The key to postharvest applications of Movento is that the leaf must be of sufficient quality to absorb the active ingredient. However, in wine grapes this is often not a possibility due to damage to the leaves during mechanical harvest or because harvest is conducted very late in the year.

Applaud (buprofezin) is an insect growth regulator that is most effective against the crawler stage, so it is best used twice in the spring – once when crawlers begin to move and 2-3 weeks later to control later emerging crawlers; optimal application dates for Applaud vary from year to year due to weather patterns such that monitoring is critical. It has a short pre-harvest interval (7 days) and is harmless to beneficials. In the five Kern County studies previously mentioned two applications of Applaud in April and May resulted in a 61.6% reduction in the percentage of clusters with mealybugs at harvest.

Neonicotinoids. There are currently five neonicotinoid active ingredients registered for use in grapes in California. This includes imidacloprid (foliar Provado, soil-applied Admire, plus generic products), clothianidin (Clutch), acetamiprid (Assail), and thiamethoxam (foliar Actara, soil-applied Platinum). In general, foliar neonicotinoids are ef-

fective against leafhoppers and in most cases grape mealybug; however, they are not very effective against vine mealybug. The primary exceptions are Clutch and to some extent Assail that have recently taken on more importance as late-season knockdown products due to the removal of grapes from the labels for Lannate and Dimethoate.

In most cases neonicotinoids for vine mealybug are most effective when applied through the drip system. In sandy soils Admire and Clutch (both with low water solubility) can be effective against vine mealybug when applied from April through June; Venom and Platinum (both with high water solubility) have not been effective in trials in sandy soil, but they have been somewhat effective in northern San Joaquin Valley vineyards with sandy loam and heavier. Research in a North Coast vineyard with heavy clay soil showed that drip-injected Venom and Platinum were somewhat effective late in the season but Admire and Clutch were not effective. Movento and Applaud were most effective in the trial.

Other Considerations in Insecticide Use. Within any management plan it is important to implement good resistance management programs. For example, if Lorsban and Movento are used during a particular year to control vine mealybug, the grower in the following year should consider using management programs based on Applaud and soil applications of Admire, Clutch, or Platinum. Because of its efficacy, some growers are using Movento annually – this strategy is a recipe for the development of insecticide resistance.

To get newly found populations under control, a good strategy is to use a combination of two insecticides, such as Lorsban plus neonicotinoids, neonicotinoids plus Movento, Movento plus Lorsban, or neonicotinoids plus Applaud.

It is important to note that the costs of using insecticides for vine mealybug control can be offset by the control of other pests. For example, the soil-applied neonicotinoids virtually remove grape leafhopper as an economic pest, and control or suppression of leafhoppers has been seen for up to 2-3 years after a single application. The cost of Movento and soil-applied neonicotinoids can be offset by nematode suppression and control of leafhoppers and thrips. Also, Applaud is effective on soft scales and Lorsban is effective on ants.

References

Daane, K. M., G. Y. Yokota, M. P. Pryor, W. J. Bentley, J. M. Hashim-Buckey, D. R. Haviland, S. Rill, M. Cooper and J. G. Millar. Selecting the needed mealybug control in table grapes. Proceedings of the San Joaquin Valley Table Grape Symposium, Visalia, CA Feb. 2, 2011.

Haviland, D. 2009. Maximizing vine mealybug control. Western Farm Press, June 15, 2009.

Smith, R. and L. Varela. 2009. Vine mealybug control trial 2009. Web site: http://cesonoma.ucdavis.edu/files/27847.pdf.

[1]David Haviland, Entomology and Pest Management Farm Advisor, UCCE Kern County.

[2]Steve Quashnick, Viticultural Services Manager, Wilbur Ellis Company.

The Dry Winter and Phytotoxicity from Dormant Sprays

Tree crop growers throughout the state have expressed concerns about the dry weather and bud phytotoxicity from spraying dormant oil. Buds are susceptible to damage for a number of reasons, and in past years I have seen damage at times with no reasonable explanation. But stress of some kind is usually the culprit. If there is little moisture in the soil, even in the winter, the tree is under some stress. In general, pears are considered more oil-tolerant than other deciduous tree crops, although most pear growers have seen some bud death in past years.

The question is at what point stress is excessive. Pear roots are deep and some of them do reach the water table, but the majority of roots are in the top 3 ft., generally above the water table. Cherry trees on dwarfing rootstocks, especially Gisela 6, are much shallower and are more prone to drying out in winter if no rains occur. If a late-season irrigation was made, there may still be enough moisture in the soil. But a deep irrigation would take the guess out of it. Bear in mind that if you only water lightly, say for 12 hours, it will help but the water might not be going deep enough to reach a majority of the roots.

More important to the health of the buds is cold and dry ambient air. Oil damage is possible with dry trees and wet soil. Also, with the warm days we've had, buds are "less dormant" than they normally are.

That, combined with freezing nighttime temperatures, may add additional stress. Also, although there has been moisture on the buds on most mornings, afternoons have generally been dry. Dry buds that are less dormant can be under some stress, and applying dormant oil to stressed buds could potentially kill some of them. Rain is not the only moisture even that can moisten buds; heavy fog could have the same effect, as could spraying with water ahead of the application.

For cherries, rest-breaking sprays such as CAN-17 are applied in January, although fewer growers use them these days. The same situation could occur with bud death from this application if trees are stressed.

For all tree & vine crops, roots begin growing before bud growth starts. So it is important to start the season with full moisture in the soil profile, meaning to a depth where most of the roots are. If you applied "some" water before the oil spray, you may need to apply more if we don't get much rain soon. A 24-hr. irrigation is advisable by the end of January, or whatever it takes to get water to the majority of roots (dig holes to see).

For more discussion on oil phytotoxicity, visit Rachel Elkins' article from her April-May 1991 newsletter (http://celake.ucdavis.edu).

Upcoming Meetings

Cherry Research Review. Tues., Jan. 24, 2012, 8:30 AM to 12:15 PM. Topics: Fungal canker diseases, managing pre- and postharvest diseases, spotted wing Drosophila, renovating the cherry industry, oriental fruit fly quarantine update. UCCE San Joaquin County office. Web site: http://uccesacramento.ucdavis.edu.

Pear Research Meeting. Thurs., Feb. 2, 2012. Walnut Grove Library. (see attached agenda)

Clarksburg District Wine Grower Meeting. Wed., Mar. 7, 2012, 9 AM to 12 PM. Jean Harvie Community Center, Walnut Grove. More details in the February newsletter.

Farm Supervisor Seminar (in Spanish). March 13-16, 2012, Modesto. Topics that will be covered include employee discipline, interpersonal negotiation skills, and the importance of praise in day-to-day communications. Registration limited to two individuals per farm operation. Contact Gregorio Billikopf (gebillikopf@ucdavis.edu) or Marie Harter at or 209-525-6800.

New Publications

Vineyard Mechanization, by Justin Morris, one of the leaders on this subject in the U.S. The book also has chapters from international mechanization leaders from Spain, France, Italy, Germany and Australia. Price: $60.00. Web site: http://shop.ashs.org.

Organic Winegrowing Manual (Univ. of Calif.). This full-color manual provides detailed information for wine grape growers on production issues, economics, weed and disease management, the process of conversion from conventional to organic, and organic certification and registration. Pub. no. 3511. Price: $35.00. 192 pp. Visit http://anrcatalog.ucdavis.edu or call (800) 994-8849.

Vineyard Pest Identification and Monitoring Cards (Univ. of Calif.). A pack of 50 sturdy, pocket-size laminated cards. Covers 27 common insects and mites, 8 diseases, 6 beneficial insects, weeds, and disorders. Pub. no. 3532. Price: $25.00. Order online at http://anrcatalog.ucdavis.edu or call (800) 994-8849.

Pear Research Meeting

Thursday, February 2, 2012
Walnut Grove Library Meeting Room, 14177 N. Market St., Walnut Grove, CA 95690
(Same building as Ag. Commissioner Office in Walnut Grove)
(a wheelchair accessible facility)

Units applied for
3.0 hours Certified Crop Advisor and 2.0 hours DPR units (including 0.5 hr. laws & regulations)

Sponsored by:
UC Cooperative Extension, Calif. Pear Advisory Board, the Pear Pest Management Research Fund, and Sacramento County Agricultural Commissioner

Agenda

8:00 Refreshments

8:25 Welcome and announcements

8:30 Optimizing puffers for control of codling moth: Reducing program costs without loss of efficacy
Frances Cave – UC Berkeley

8:50 Evaluation of new bactericides for control of fire blight
Jim Adaskaveg – UC Riverside

9:10 Laws & regulations update
Karen Vietheer – Sacramento County Ag. Commissioner's Office

9:40 --*Break*--

10:00 Outreach to preserve pheromone mating disruption programs in California and Oregon pear orchards
Evaluation of potential components of a fire blight IPM program
Evaluation of potential new size-controlling rootstocks for European pears
Rachel Elkins – UCCE Lake & Mendocino Counties

11:00 Optimizing fertilizer practices based on seasonal demand and supply
Kitren Glozer – UC Davis

11:20 Finding cost-effective weed and nutrient management practices in organic pear orchards
Chuck Ingels – UCCE Sacramento County

11:40 Improved media for micropropagation of dwarfing pear rootstocks
Rachel Elkins (for Barbara Reed – USDA/ARS National Clonal Germplasm Repository, Corvallis, Oregon)

12:00 Adjourn