University of California Cooperative Extension Fresno County

Vine Lines

October 2006 Issue

Stephen J. Vasquez, Viticulture Farm Advisor

Reducing VOCs Using Weed Management

Anil Shrestha and Rick Roush

What are Volatile Organic Compounds?

Volatile organic compounds (VOCs) are carbon-containing substances that have a high vapor pressure and low water solubility. These compounds are present in hundreds of products such as paints, refrigerants, pharmaceuticals, exhaust fumes, cigarette smoke, household chemicals, formaldehyde, polynuclear aromatic hydrocarbons, and certain pesticides. Even if sold as a liquid, these compounds volatilize into gaseous or vapor form when exposed to air. VOCs can contribute to the formation of ground level ozone (by combining with nitrogen oxides in the presence of sunlight). VOCs also contribute to the greenhouse effect as methane and photochemical oxidants produced from them are both green house gases. Some VOCs are also believed to be common ground-water contaminants.

Why the recent concern about VOCs?

In California, all industries and sources of compounds that contribute to ozone formation are being asked to make changes to reduce emissions to meet the new more stringent ground-level ozone standard in the San Joaquin Valley. There are thousands of organic compounds in the troposphere that meet the definition of a VOC; however, most attention has been focused on the 50 to 150 most abundant hydrocarbons. One such focus of the California Department of Pesticide Regulation (DPR) is on VOC emissions from pesticides because many active and especially inert ingredients in pesticides are VOCs. Pesticides accounted for 6.3% of the total VOC emission in 2004.

Each state is required to submit a State Implementation Plan (SIP) for achieving and

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Recognizing and Managing Vine Mealybug

Walter Bentley and Stephen Vasquez

If you don't detect vine mealybug (VMB) infestations by harvest, your grape picking crew or processor will. Although there is nothing that can be done to reduce infestation at that time, knowing the specific areas in the vineyard that are infested is important in managing the pest over seasons.

First, a brief description of what your grape harvesters will find. The upper canopy may not show much sign of infestation. However, the crown of the plant will be covered with sticky, dripping honeydew that extends down the trunk. The vine will also look as if oil were dripped onto the crown. The clusters in the immediate area will be covered with the sticky, syrup-like material. Mealybug body parts and, especially, egg cases and crawlers will be found throughout the clusters. This sort of infestation should not be mistakenly attributed to grape mealybug. Grape mealybug will not produce such levels of honeydew. Vines where these symptoms are found should be flagged. Either the harvest crew or an individual assigned to walk the vineyard can identify and mark infested vines. There are a number of good publications that show what to look for. One of the best

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maintaining federal ambient air quality standards, including the standard for ozone according to the Federal Clean Air Act. Regions that do not meet either federal or state ambient air quality standards are called Nonattainment areas (NAAs) in California. The NAAs include the Sacramento Metro, the San Joaquin Valley, Ventura, South Coast, and the Southeast Desert. In 1994, California's Air Resources Board (ARB) and DPR developed a plan to reduce pesticidal sources of VOCs in NAAs as part of the California SIP to meet the 1-hour ozone standard. Pesticidal VOC emissions in the San Joaquin Valley NAA declined for several years, but have recently increased above the limit specified in the SIP. In April 2004, the U.S. EPA issued a more stringent 8-hour ozone standard, likely requiring additional VOC reductions. DPR is preparing a new SIP and it is very likely that additional VOC reductions from all sources will be required to meet the new ozone standard.

How does DPR estimate VOCs?

DPR estimates VOC emission as the product of VOC fraction in product and the amount of product applied (emission = VOC fraction in product X amount of product). The emission potential of the VOC is determined by lab test (thermogravimetric analysis, TGA), water inorganic subtraction, confidential statement of formula, or a default value. The DPR has been estimating VOC emissions from agricultural and commercial structural applications for each year since 1991. Their data show that more than 90% of the emission from pesticides is from agricultural sources except on the South Coast. DPR, ARB, and others are working to increase the accuracy of VOC emission estimates and reduce VOC emissions from pesticides. It should be noted that the current method of estimation assumes a 100% loss of the VOCs in the pesticide. However, revisions are planned on the estimation methods.

So what does this mean for weed management?

In California, weed control remains a significant cost in crop production and in non-crop areas (e.g., roadsides, urban area, forests, aquifers and waterways, etc.) vegetation management. Herbicides are still the primary tool for weed management in most crop and non-crop areas. DPR agricultural data shows that by acres treated, the pesticides with the greatest use in 2002, after sulfur, were glyphosate, oxyfluorfen, and paraquat dichloride, all herbicides.

Herbicides come in several formulations: solutions (S), liquids (L), dry flowables (DF), water dispersible granules (WDG), wettable powders (WP), flowables (F), micro-encapsulated (ME), and emulsifiable concentrates (EC). All these formulations are generally mixed with water and sprayed. There is a general focus on EC formulation of herbicides because they are believed to be the highest VOC contributors among the various formulations.

An EC is a pesticide formulation consisting of an active ingredient and an emulsifying agent in an organic solvent. The solvent is usually not soluble in water. When an EC product is mixed with water prior to application, the resulting mix is a dispersion of fine, oily particles in water.

Herbicides with an emission potential greater than 20 percent.

Several herbicides are available in EC and other forms. The DPR has prepared a database of EC products with emission potentials of more than 20% by active ingredient. Table 1. shows the herbicides and the commodities which they are used in.

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Weed Management

Table 1. Emulsifiable concentrated products with emission potential >20%.

Commodity	Active Ingredient	2003 Application Acres	Share Harvested Acres
Almond	Oxyfluorfen	262,042	48%
Apple	Oxyfluorfen	3,527	13%
Bok Choy	Bensulide	137	-
Carrot	Trifluralin	9,487	13%
Cherry	Oxyfluorfen	8,060	32%
Cherry	Paraquat Dichloride	3,021	12%
Grape	Oxyfluorfen	70,036	21%
Kiwi	Oxyfluorfen	600	13%
Nectarine	Oxyfluorfen	12,403	34%
Onion, dry	Bromoxynil Heptanoate	14,138	32%
Onion, dry	Bromoxynil Octanoate	16,677	38%
Onion, dry	Oxyfluorfen	8,740	20%
Onion, dry	Pendimethalin	6,418	15%
Onion, green	Bromoxynil Heptanoate	239	-
Onion, green	Bromoxynil Octanoate	243	-
Onion, green	Oxyfluorfen	83	-
Peach	Oxyfluorfen	16,718	25%
Persimmon	Oxyfluorfen	136	-
Plum	Oxyfluorfen	9,250	26%
Squash, zucchini	Bensulide	105	-
Tangerine	Trifluralin	1,349	14%
Tomato	Trifluralin	12,147	33%
Tomato, Processing	Trifluralin	95,056	35%

Herbicides (active ingredient with trade names in parenthesis) that have VOC emission potentials and might be subjected to reformulation include:

1. 2,4-D (Weedone Lo Vol 6, Albaugh Solve 2,4-D, Speed Zone St. Augustine Formula Broadleaf herbicide, Speed Zone Southern Broadleaf herbicide for turf, Crossbow, Spectracide Lawn weed killer 2 33 Plus, Weedar 64, Weedaxe, Nufarm Esteron 99 concentrate herbicide, Hivol-44, Brush Buster).
2. Acrolein (Magnacide H)
3. Alachlor (Lasso)
4. Bromoxynil Octanoate (Buctril, Buctril EC)
5. Clethodim (Prism 2 EC, Envoy)
6. Dicamba , Dimethylamine salt (Banvel)
7. Dithiopyr (Dimension)
8. Ethalfluralin (Sonalan HFP, Sonalan EC, Clean Crop Curbit EC)
9. Metolachlor, S-Metolachlor (Dual Magnum, Dual II Magnum, Pennant Magnum)
10. Oxyfluorfen (Goal 1.6 E, Goal T/O, Goal 2E, Goal 2XL, Galigan 2E)
11. Pendimethalin (Stomp 3.3EC, Prowl 3.3EC, Pendulum 3.3EC)
12. Sethoxydim (Poast, Grass Getter)
13. Triclopyr, Butoxyethyl ester (Turflon Ester, Garlon 4, Remedy)
14. Trifluralin (Treflan HFP, Tenkoz Trifluralin 4EC, Triap 4HF, Treflan EC, Treflan 5, Gowan Trifluralin 4, Gowan Trifluralin 5, Trilin 5, Trilin, Tenkoz Trifluralin 4EC, Clean Crop Trifluralin HF, Seadagri Trifluralin 480, Vegetable and ornamental weeder)

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Weed Management

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It should not be assumed that this is a complete list nor that changes will necessarily be made to any given product. As a general rule of thumb, DPR's review will probably affect most products with an E or EC formulation. There are many glyphosate products with EC formulations, however. These products are currently under review. Table 2 provides an example of the emission potential of some herbicides and their various formulations.

With so many common successful herbicides on the watch-list, it remains to be seen what affect these regulatory changes will have on day-to-day weed management. In some cases, it may be as simple as replacing an EC with a non-EC formulation. Similarly, in some cases it may be possible to obtain exemptions based on critical needs. However, we should be considering the impacts on production and investigating alternatives to manage weeds in our cropping systems.

Anil Shrestha is an IPM Weed Ecologist at Kearney Agricultural Center. Rick Roush is the director of the California Statewide IPM Program.

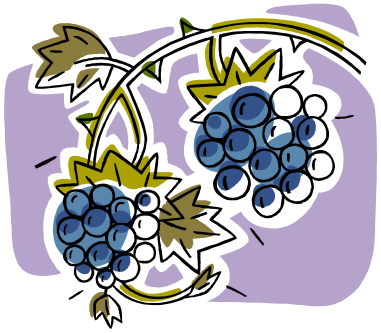

Table 2. Emission potential and herbicide formulations.

Herbicide	Emission Potential (EP)	Formulation
Glyphosate		
Glyfos X-tra herbicide	5.71	liquid concentrate
RoundUp Original Herbicide	0	liquid concentrate
RoundUp Superconcentrate Weed & Grass Killer	39.15	EC
RoundUp Ultra Herbicide	5.71	liquid concentrate
RoundUp Ultramax Herbicide	39.15	EC
Oxyfluorfen		
Goal 2XL Herbicide	39.15	EC
Galigan 2E Oxyfluorfen	39.15	EC
Goal 2XL	39.15	EC
Goal 1.6 E Herbicide	65.5	EC
Goal 2E Herbicide	39.15	EC
Trifluralin		
Gowan Trifluralin 4	39.15	EC
Triap 4HF	53.65	EC
Treflan HFP	53.65	EC
Clean Crop Trifluralin HF	39.15	EC
Tenkoz Trifluralin 4 EC	53.65	EC
Tenkoz Trifluralin 10G	3.31	Granular/Flakes
Gowan Trifluralin 10G	3.7	Granular/Flakes
Surflan A.S.	39.15	EC
Farmsaver.com oryzalin 4 A.S.	5.71	Aqueous conc.
Surflan A.S.	7.3	solution/liquid
Surflan A.S.	7.4	solution/liquid
Oryza AG	5.71	Aqueous conc.
Vegetation Manager Oryzalin 4 Pro	5.71	Aqueous conc.
Gramoxone Extra Herbicide	0	solution/liquid
Gramoxone Max	5.71	Aqueous conc.
Gramoxone Super Herbicide	37.54	EC
Gramoxone Paraquat Herbicide	7.3	solution/liquid
Ortho Paraquat CL	7.3	solution/liquid
Starfire Concentrate	0	Aqueous conc.
Clean Crop Paraquat Plus	7.3	solution/liquid
EPTC		
Eptam 7E selective herbicide (only active EPTC reg.)	97.9	EC

Maturing Wine Industry to Offer Quality Wines at Lower Prices

Consumers can look forward to purchasing high-quality wines at affordable prices as the U.S. wine industry matures and wine becomes more of an every-day beverage in American households, according to a recent survey of top industry executives conducted by Robert Smiley, professor and director of wine studies in the Graduate School of Management at the University of California, Davis. Smiley reported his survey findings and results from a broader survey of wine industry professionals at the Wine Industry Financial Symposium on September 20th in Napa, Calif.

"The wine industry is basically healthy -- despite a record 2005 crop and a worldwide surplus of relatively inexpensive wine -- due largely to growing consumption by young adults," said Smiley. "Industry professionals expect the current shortage of pinot noir and pinot grigio to continue, and further expect average prices to creep up as the oversupply of other varietals is used up to satisfy growing demand."

Survey of Wine Executives

In his eighth annual survey of wine executives, Smiley interviewed the heads of 30 key wine operations, ranging from growers to distributors. These executives noted that:

* The hottest issues in the wine industry during the next five years will include consumer flavor and pricing preferences, environmental farming, regulatory challenges and direct shipping.

* Increased turnover in brand appeal will likely force producers to become more innovative with their products, labels and wine quality. These shorter brand-life cycles will reduce profit margins for producers. Retailers -- who are most in tune with consumer demands -- will drive brand selections.

* Consolidation of wine distributors, which has been occurring regionally, is beginning to occur nationally. New, smaller and more niche-focused distributors will continue to appear, however, to provide a level of service desired by wine producers and retailers.

* Recent industry strategies have focused more on estate wines -- those wines produced exclusively from grapes grown in vineyards belonging to one winery. Wineries also are gearing up to develop more creative packaging and marketing efforts, and plan to expand their businesses by acquiring more established brands.

* Oversupply will continue to be a cyclical problem, due to the agricultural nature of the industry, but increasing worldwide and domestic consumption will help absorb the excess wine.

Survey of Wine Professionals

The broader survey of wine professionals, now in its 15th year, included 176 responding wine producers, wine grape growers, distributors, retailers and lenders. It is the largest of its kind in the wine industry.

"Industry participants are generally optimistic about the wine industry and feel that sales of wines in the mid-teens should grow most rapidly," Smiley said. "The respondents feel that pinot noir and red zinfandel are particularly well suited to the emerging consumer tastes." This year's survey revealed that 75 percent of wineries plan to introduce new wine varietals or blends and 50 percent plan to release new packaging during the next three years. Industry growth is expected in the mid-to-upper price range and will likely be strongest in wines selling for $10 to $14 per bottle.

The greatest growth in sales among red varietals will likely occur in pinot noir, followed by syrah, red zinfandel and cabernet sauvignon, the respondents projected. Among white varietals, the growth is expected to be strongest in sauvignon blanc, chardonnay and pinot grigio.

The greatest shortage of grapes among red varietals is anticipated to be in pinot noir grapes, followed by red zinfandel. Among white varietals, a shortage will be most prominent in pinot grigio, followed by chardonnay.

Growers responding to the survey indicated that the greatest growth in wine-grape production is now occurring in the North Coast region, where vineyards in development make up 18 percent of the total acreage. Sonoma follows closely with 16 percent and Napa with more than 14 percent of the total acreage under develop. The growers reported that the North Coast region is also seeing the greatest concentration of organic vineyard management. More than 30 percent of North Coast vineyards are grown organically, followed by 17 percent in Sonoma and 3 percent in Napa.

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Quality Wines at Lower Prices

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Most of the largest wineries indicated that they plan to obtain grapes internationally during the next three years. More than 60 percent of the wineries producing more than 1 million cases annually said that they will be growing or purchasing grapes globally. As the wine industry matures and wineries release new products, distributors and retailers will be deciding which new wines to carry. The survey revealed that about 23 percent of distributors plan to make those decisions based largely on an established relationship with the supplier, followed by the price and value of the new wine. Retailers, on the other hand, said that quality, followed by price and value, of the wines will determine which new products make it onto their shelves.

Looking at the international wine market, all respondents project an increase in market share for Spanish wines, and decreasing market share for French.

The UC Davis Graduate School of Management will continue its work with California wine executives when it collaborates with the UC Davis Department of Viticulture and Enology in offering the Wine Executive Program March 4-8 in Sacramento. The four-day program will focus on "Blending the Business and Science of Wine-making." More information about this this spring program is available online at:

http://www.wineexecutiveprogram.com

Vine Mealybug

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is entitled *Vine Mealybug: What You Should Know*, UC publications 8152. It is available at your local Farm Advisor Office.

If the infestation is new, a post harvest application should be made. The treatment should be made prior to mid November. Guidelines for treatment can be found in UC ANR publication 3448 entitled *UC IPM Guidelines for Grapes*. Information can also be found at http://www.ipm.ucdavis.edu/. The post harvest application is critical in preventing the spread of VMB via wind blown leaves.

The vines flagged at harvest should be examined in the spring (early March) for both survival of mealybugs sprayed post harvest and for timing spring applications. Survey the base of spurs near the crown of the vine. Use a magnifying glass to identify the small crawlers that are migrating up the vine. Spring applications should be made when air temperature is above 60ºF. Warmer temperatures encourage VMB activity and they will quickly disperse throughout the vine. Cool temperatures (below 60ºF) impede movement and, consequently, exposure to insecticides. You will save yourself a lot of time by looking at vines that were known to be infested the previous year. The next critical period for finding VMB is mid May. Survey previously infested vines and look for VMB crawlers on basal leaves. They will feel tacky or sticky, which is an indication they are beginning to feed. As soon as crawlers are found on leaves, an application should be made to keep them from establishing on fruit and foliage. Infestations on the trunk will display new honeydew secretions as described above. Also, ants will be quite active. Following their activity on the vine will eventually lead to mealybugs hidden under bark.

The approach we have outlined above may appear excessive and costly, but experience has shown it is not overkill. Following these steps will help restrict spread in your vineyard as well as slow population growth. In subsequent years a reduced spray approach may be warranted for vineyards producing raisin or wine grapes.

Vine mealybug infestations are spreading rapidly in the San Joaquin Valley. What has been both surprising and disappointing has been the lack of awareness about this destructive pest. Growers should have crews trained to identify early VMB infestations in order to limit cost of season to season management and contaminated fruit. Visit your local UC Cooperative Extension office for the most recent information.

Walt Bentley is an Entomologist at the Kearney Agricultural Center. Stephen Vasquez is a UC Cooperative Extension Farm Advisor in Fresno County

Calendar of Events

Local Meetings and Events:

Raisin Production Issues
November 8, 2006
10:00 a.m.— 12:00 p.m.
San Joaquin Valley Viticulture Technical Group
Fresno County Farm Bureau,
1274 W. Hedges Ave. Fresno, CA.
Contact: Jon Holmquist (559) 661-5539

U.C. Davis University Extension Meetings

(800) 752-0881

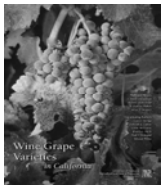
Fundamentals of Wine Chemistry
October 28, and November. 4, 2006
Medical Science Building, E. Health Science Dr.
Davis, CA.
9:00 a.m. — 4:30 p.m.
Instructor: Clark Smith
Section: 062VIT202

Public Relations for Small Wineries
November 3, 2006
Da Vinci Building, 1632 Da Vinci Ct.,
Davis, CA.
9:00 a.m. — 4:00 p.m.
Instructor: Rusty Eddy
Section: 062VIT211

Current Issues in Vineyard Health
November 29, 2006
Da Vinci Building, 1632 Da Vinci Ct.,
Davis, CA.
9:00 a.m. — 4:00 p.m.
Instructor: Deborah Golino
Section: 061VIT201

Introduction to Wine Analysis for Professional Winemakers and Winery Lab Workers
December 2, 2006
Enology Building, California Avenue
Davis, CA.
8:00 a.m. — 6:00 .p.m.
Instructor Michael Ramsey
Section: 062VIT208

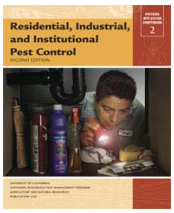
Publications from the University of California



Wine Grape Varieties in California, 2003
ANR Publication 3419
Price - $30.00 + tax and shipping

A comprehensive variety publication. Covers all the grape growing districts in California, highlighting 36 major varieties.

Revised Edition



Residential, Industrial, and Institutional Pest Control, 2nd Edition, 2006
ANR Publication 3334
Price - $30.00 + tax and shipping

Volume 2 in the Pesticide Application Compendium focuses on managing structural, food, and fabric pests, rodents, birds, and weeds.

Order Form

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Pest Control		$30.00	

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Produced by U. C. Cooperative Extension Farm Advisor Stephen J. Vasquez. Contact me for further article information, or to be added to the mailing list.

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Fresno, CA 93702
Hours: 8:00—5:00 M-F

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