University of California
Cooperative Extension
July 1999 **SONOMA COUNTY VITICULTURE NEWSLETTER**

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ANNOUNCEMENTS

Erosion Control Field Day - August 10, 1999. Presented by UC Cooperative Extension Napa County and the Napa Sustainable Winegrowing Group. Location: Carneros Region in Napa County. Contact the UC Cooperative Extension office for directions at 707-253-4221. Time: 1:00 pm – 4:00 pm. Drop in during the afternoon to see equipment and demonstrations of cover crop seed drills and broadcast spreaders, straw blowers and crimpers, mulch applicators, etc.

The use of compost as an erosion control method in hillside vineyards is being investigated in a demonstration project in two vineyards located in each Napa and Sonoma Counties. The project, titled "Utilization of Composted Mulch for Erosion Control in Hillside Vineyards" is funded by the California Integrated Waste Management Board. In addition to the four grower cooperators, the agencies and companies involved in the project include the Napa County Resource Conservation District, the Sotoyome Resource Conservation District, Sonoma Compost Company, Napa Garbage Service, City of Napa, Sonoma County Farm Bureau, USDA Natural Resource Conservation Service in Napa, and UC Cooperative Extension in Napa and Sonoma Counties. Project-specific information is only one component of this field day.

Irrigation Scheduling Field Day – Friday, August 13, 1999. Presented by the Department of Land Air and Water Resources, UC Davis and UC Cooperative Extension Sonoma County. LOCATION: Hopland Research and Extension Center (HREC), Hopland. TIME: 9:30 am – 11:30 am AND 1:00 pm – 3:00 pm. **RSVP is required!** There is a limited number of people that can attend this field day therefore you must call my office at 707-565-2621 and reserve a spot in EITHER the morning or afternoon session. Reservations are on a first come, first served basis. The same information will be presented in both sessions. DIRECTIONS: (HREC is about 35 miles north of Healdsburg.) Take 101 N into Hopland. While on 101, turn right onto Highway 175 just past the Hopland Farms' Exxon station. Cross the Russian River and continue on Hwy 175 through the old section of Hopland. When the road bends to the right, (about 2 miles after leaving Hwy 101), turn left onto Eastside Road. In one tenth of a mile, turn right onto University Road. Follow the road to the station headquarters and look for parking direction signs. You will

have to walk about an eighth of a mile to the vineyard.

I am conducting this trial with Terry Prichard, Water Management Specialist and Erica Lundquist, Post Graduate Researcher, both in the Department of Land, Air and Water Resources. It is in a 1.4 acre Cabernet sauvignon research vineyard that was planted in 1991. The irrigation system was designed and installed to facilitate independent water delivery to 24 plots. A plot consists of nine vines in each of three adjacent rows. Irrigation strategy treatments were first imposed in 1997. Leaf water potential is used as a trigger to determine when to begin supplying irrigation water. Subsequent applications are made at various fractions of daily, full vine water use through harvest. We will discuss an over view of the trial's results to date and the pressure bomb and neutron probe will be demonstrated.

Managing Riparian Vegetation to Control Pierce's Disease

Pierce's disease (PD) of grapevines is caused by a bacterium that blocks water-conducting vessels and can cause susceptible winegrape varieties to die in one to two years. The bacterium is called *Xylella fastidiosa* (Xf) and is transmitted to the vine by insect vectors that feed by extracting xylem fluid from plants. The principle vector in the North Coast is the blue-green sharpshooter (BGSS). Xf resides in the xylem of many perennial and annual plants that are commonly found in riparian areas. These symptomless hosts act as reservoirs of the pathogen and yet continue to thrive in spite of the fact they are infected.

Disease incidence is highest in areas of the vineyard that are adjacent to riparian vegetation. This is due to two reasons. First, the insects overwinter as adults in riparian areas and, in warm spring conditions, begin to fly to the vineyard about the same time budbreak occurs. If a BGSS has fed upon an infected plant in the riparian area or an infected grapevine the previous fall, then it is capable of transmitting the pathogen to nearby vines in the spring. Second, when vines are infected in the spring, they are more likely to become chronically infected. This is because Xf has time to multiply and spread through the vine before winter. When vines are infected later in the season – from about late June through Fall – they often "recover" from these late infections. They do not have disease symptoms in the fall, and Xf cannot be found in them the following spring. It is believed that in late season infections, the pathogen does not have enough time to move to the parts of the vine that will remain after pruning. Despite the fact that BGSS are more evenly distributed throughout the vineyard during the summer than they are in spring, only the vines close to the riparian source are chronically infected and thus can die from PD.

Because of the role that riparian vegetation plays in PD epidemiology, much attention has been focused by researchers and growers alike on the feeding and breeding host plants of the BGSS as well as those plants that contain high levels of Xf. One method of reducing the incidence of PD in areas known to be "hot spots" is to remove and replace targeted plants in the riparian corridor. This method of managing PD ought to be approached carefully because of the potential impacts on erosion, water quality, fisheries, wildlife and even the movement of the water. Also, growers planning new developments in areas in which grapevines are not traditionally planted ought to determine the potential for the disease before removing adjacent riparian vegetation. There are many new grape growing areas in the North Coast. Not all of them will be at risk for PD. Growers in these sites ought to confirm the presence of PD in neighboring vineyards (if any) and

determine if the preferred host plants for BGSS are present.

There are scores of plants native to the North Coast riparian habitats yet very few of them play a major role in PD. Also BGSS prefer to feed on few plants in the spring relative to the summer when their preferences may shift. The insect prefers to feed on vigorously growing succulent plants. As a result, it is important to maintain and attempt to enhance trees. Dense shade from tree canopies will discourage vigorous plant growth in the understory thus providing less than ideal conditions for BGSS.

Most trees, including willows, either do not support breeding populations of BGSS or they are only rare or occasional feeding hosts. If a tree supports a low amount of BGSS, it may only be for a short period of time or because it is immediately adjacent to a highly preferred host.

Most of the plants that BGSS feed on in the spring are also plants where it lays its eggs. Not surprisingly, there is significant overlap between the plants that support the BGSS – as feeding or breeding hosts – and the plants that are systemically infected with Xf. By carefully replacing these plants with ones that are less preferred or not preferred, the population of BGSS can be reduced and there will be fewer insects migrating to the vineyard in spring.

The most commonly occurring preferred BGSS host plants in Napa and Sonoma Counties are wild grape, blackberry – both Himalayan and California, elderberry, periwinkle and mugwort. The less commonly occurring preferred hosts are stinging nettle, mulefat and Bricklebush.

This plant list is not inclusive – meaning there are other plants that in some sites are preferred hosts that may contribute to high insect numbers. Also, most plants can support Xf to some degree, but it is not practical to target all such plants for removal. Most importantly, there are riparian areas that contain one or more of the species on the above list yet the population of BGSS remains relatively low on specific plants. This could be due to the dense shading provided by tree canopies or direct sunlight - either of which may cause some normally preferred host plants to be less then optimal food sources under some conditions.

The California Department of Fish and Game (DFG) must be notified of any plans to remove or modify the vegetation along the bed, banks or tops of banks of streams or rivers for PD management. A recent court decision has caused the DFG to modify its previous 1603 Streambed Alteration Agreement process. The Central Coast Region of DFG, which serves an area that includes Napa, Sonoma, Lake and Mendocino Counties, now refers to it as a "permit" process. This is because each landowner’s notification packet proposing alterations to a streambed, bank, etc. must be reviewed to determine if the project may impact fish or wildlife resources. If the department determines that your proposed project may substantially adversely affect fish and wildlife resources, then you will need to obtain a permit that will be reviewed in accordance with the California Environmental Quality Act. For further information, contact the DFG office in Yountville at 707-944-5520.

Not all riparian habitats are in the greatest shape, and many are in need of restoration for such reasons as invasion by exotic plants and/or upstream land uses. The riparian habitat can be managed in a way so that multiple objectives can be met. These include reducing – but not eliminating – PD and enhancing plant diversity. Riparian restoration projects can be quite involved, and such projects require a permit from DFG. Private sector restoration specialists can

provide advice as well as design and implement a plan for modifying the vegetation in a riparian area to simultaneously meet several objectives. These include PD host plant removal, selection of appropriate replacement plant species, erosion control and fishery habitat protection. The bottom line: enhancing or restoring a healthy riparian habitat can simultaneously reduce the incidence of PD in an adjacent vineyard.

For information on restoring riparian habitats, growers may request the new publication *A Guide to Restoring Native Riparian Habitat in the Russian River Watershed* by Circuit Rider Productions, Inc. and the Sonoma County Water Agency. It is currently available in draft form until plant photographs can be reproduced with greater resolution. For a free copy, contact the Sonoma County Water Agency at 707-547-1900.

039-19 and 043-43 Mixed up for a period of time

Grapevine nurseries that ordered mist propagated registered plants of 039-16 rootstock from UC Davis Foundation Plant Materials Service (FPMS) from 1986 to 1990 received some amount of 043-43 rootstock by mistake. Andrew Walker, plant geneticist in the Department of Viticulture and Enology at UC Davis, recently completed a statewide survey of nursery increase blocks that contain 039-16 rootstock. Andy used ampelography (visual identification) as well as a DNA-based technique he developed to determine the identity of each plant. His findings indicate that fewer than 8% of the vines in nurseries' 039-16 increase blocks are contaminated with 043-43 vines.

The mix-up primarily affects North Coast grape growers because very little 039-16 rootstock is used by growers from outside this grape growing region. 039-16 is known as a VR hybrid rootstock. It was developed at the University of California, Davis grape breeding program by crossing a female *Vitis vinifera* vine with a male *Muscadinia rotundifolia.* It has very strong resistance to *Xiphinema index*, the dagger nematode vector of grapevine fanleaf virus (GFLV). Although this rootstock resists *X. index* feeding, it allows movement of GFLV into scions; however, thus far, the severe decline in fruit set typical of GFLV infection does not occur. The phylloxera resistance of this rootstock is uncertain because of its *V. vinifera* parentage, thus it is not recommended for use unless a site is known to have fanleaf degeneration.

In 1985, both 039-16 and a sister seedling, 043-43 were released to nurseries by UC Davis. Within a short period of time, it became apparent that 043-43 was susceptible to attack by phylloxera. As a result, nurseries stopped selling it to growers and they removed all 043-43 rootstock increase blocks. Due to the mist-propagated plant collection practices employed at the time by FPMS, 039-16 increase blocks established between about 1986 to 1990 were contaminated with plants of 043-43. As a result, many growers who purchased dormant rootings or benchgrafts of 039-16 from these nurseries during this time period most likely received an unknown percentage of 043-43 plants and these are susceptible to phylloxera.

039-16 increase blocks that were established with mist propagated plants by nurseries after 1990 are not contaminated with 043-43 rootstock because FPMS modified the manner in which it handled distribution of wood. Also, increase blocks established with dormant cuttings of 039-16 are most likely not contaminated.

Results of a planting survey I conducted in Sonoma County in conjunction with Ed Weber in Napa County between 1992 and 1997, indicated that 039-16 made up about 3% and 5% of the acres planted in Sonoma and Napa Counties respectively during that time period. Although some growers did not respond to our surveys, those that did in any given year were responsible for farming over 80% of the winegrape acreage planted in both counties. As a result, we feel our estimates are in the ball park. (The California Department of Food and Agriculture does not collect grape acreage data by rootstock.) These figures are probably indicative of the relative amount of acres planted to 039-16 since the rootstock was made available to winegrape growers.

Growers currently farming blocks of vines on 039-16 rootstock should contact their nursery source to inquire about the results of the increase block survey conducted at that site. Some growers will find that the wood they purchased came from sites that were not contaminated at all. Nurseries that have purchased materials from other nursery increase blocks may request information about those blocks from FPMS.

If any decline is currently apparent in vineyard blocks planted to 039-16 rootstock, then please contact me. I will visit your vineyard and assist in the diagnosis of any such decline.

Powdery Mildew Resistance Management

Veraison is just beginning and the last few protectant powdery mildew fungicides will be applied to grapevines within the next few weeks. According to the UC Davis risk assessment model for powdery mildew, 1999 thus far was the year of extremes in many areas of Sonoma County. For significant periods of time it was too cool for mildew to be a serious threat. The too brief hot spells we have had thus far also kept mildew pressure low. On the other hand, there were brief periods when the risk index steadily climbed to 100 – its maximum – and remained high until re-occurring cool weather allowed it to drop. For an overview of how to control powdery mildew with the UC Davis risk index model, go to the UCD Department of Plant Pathology Cooperative Extension web site http://www.plpnem.ucdavis.edu/plp/ext/index.htm

In a newsletter article I wrote last year concerning powdery mildew control, I discussed resistance management in the context of trying to stop existing infections. I stated that selected contact materials ought to be used to reduce the amount of viable fungal hyphae and not locally systemic or systemic materials. I should have also emphasized that growers must follow up with a longer lasting protectant after the clean-up material is used.

Soon after the 1999 harvest, growers may want to consider making an application of AQ10. This biological fungicide can colonize the cleistothecia – the overwintering structures of powdery mildew – that are present on the foliage in late summer. AQ10 spores then consume cleistothecia and form their own fruiting bodies. This may reduce powdery mildew inoculum load in your vineyard next spring. AQ10 may be tank mixed with a light oil for this late application. The oil will not only increase the germination rate of the AQ10 spores but it will also kill any active mildew hyphae it contacts.

The tables on the following page provide a brief overview of the types of fungicides available for powdery mildew control in grapevines. Growers should utilize contact materials in conjunction with locally systemic and systemic materials in a manner that will reduce the development of

resistant mildew isolates in their vineyards. More information is available in a publication available at the web site indicated above.

Categories of Grape Powdery Mildew Fungicides by Activity

Contact:	Locally Systemic:	Contact and Systemic:
All sulfur products, copper products, oils, fatty acid, potassium bicarbonate, biofungicides	**All demethylation inhibitors (DMI). These materials are also known as sterol inhibitors (SI) and ergosterol biosynthesis inhibitors (EBI)**	**Stobilurins**

Types of Products Used to Control Grape Powdery Mildew by Activity, and their Mode of Action [1]

Updated May13, 2002

ACTIVITY	TYPES OF PRODUCTS	MATERIALS	ACTIVE INGREDIENT	MODE OF ACTION
Contact	Sulfur Materials	dusts	elemental sulfur	Interferes with fungal cellular respiration
		micronized sulfurs	elemental sulfur	Interferes with fungal cellular respiration
		lime sulfur	calcium polysulfide	Highly alkaline; interferes with fungal cellular respiration
	Metallic Ion	copper	copper hydroxide	Copper ion toxicity; inactivates some enzyme systems
	Light Oils	petroleum products	petroleum distillates	Mildew hyphae are smothered
	Fatty Acid	M-Pede	salt of a fatty acid	Mildew hyphae collapse and dessicate
	Potassium bicarbonate	Kaligreen	potassium bicarbonate	Mildew hyphae collapse
	Biofungicides	AQ 10	*Ampelomyces quisqualis*	A fungus that parasitizes the powdery mildew fungus

		Serenade	*Bacillus subtilis (QST713)*	Fermentation product of a bacterium that inhibits cell growth of fungi and bacteria
Locally Systemic	DMI Materials (2)	Bayleton	triadimefon	Prevents the synthesis of ergosterol - a sterol that is needed by fungi to grow
		Elite	tebuconazole	Prevents the synthesis of ergosterol - a sterol that is needed by fungi to grow
		Procure	triflumizole	Prevents the synthesis of ergosterol - a sterol that is needed by fungi to grow
		Rally	myclobutanil	Prevents the synthesis of ergosterol - a sterol that is needed by fungi to grow
		Rubigan	fenarimol	Prevents the synthesis of ergosterol - a sterol that is needed by fungi to grow
	Materials that trigger natural plant defense mechanisms	Messenger	Harpin protein	Complex. Includes activation of certain plant growth systems.
		Elexa	Chitosan	Induces plant defense mechanisms
Systemic	Strobilurins	Abound	azoxystrobin	Inhibits fungal respiration
		Flint	trifloxystrobin	Inhibits fungal respiration
		Sovran	Kresoxim-methyl	Inhibits fungal respiration

[1] No endorsement of named products is intended, nor is criticism implied of similar products that are not mentioned.
[2] Demethylation inhibitors. Also referred to as sterol inhibitors (SI) and ergosterol bisynthesis inhibitors (EBI).

Publication Request Order Form. Updated 11-2002

Predicting Yield in Winegrapes

Crop estimation is never an easy task, and in some years, in spite of tried and true techniques that are often time-consuming, predictions do not even come close to reality. The following articles describe a few of the techniques that have been evaluated by researchers. Some methods are still under investigation. If you are interested in receiving a set of these articles, you must print the last page of this newsletter. Write in the information requested and return it, along with a SASE, to the Sonoma County UC Cooperative Extension office. Please include your phone number in case we have questions.

- **Improving the Accuracy of Wine Grape Yield Forecasts: A Progress Report.**

Authors: Nick Dokoozlian, Mike Moriyama and Larry Bettiga.
In Proceedings Central Coast Winegrape Seminar, Salinas, California, 1995.
[A process utilizing degree-day accumulation is described that estimates when fruit reaches 50% of its final weight. Crop weight on this date can be doubled to predict final yield. The relationship between berry development and degree-day accumulation for different varieties has yet to be determined.]

- **Predicting and Controlling Crop on Minimal Pruned Grapevines**

Authors: R.M. Pool, R.E. Dunst, D.C. Crowe, H. Hubbard, G.E. Howard, G. DeGolier.
In Proceedings of the Second N. J. Shaulis Symposium on Pruning Mechanization and Crop Control, Fredonia State University, Fredonia NY, July 13-14, 1993.

- **Predicting Yield in Oregon Vineyards.**

Author: Steve Price
Practical Winery and Vineyard, May/June 1988.
[A method of predicting yield for Pinot noir in Oregon is presented. Requires measurements, estimates of number of bearing vines per block, clusters per vine, cluster weight at lag phase of berry growth and at harvest.]

- **Predicting Yield in Oregon Vineyards.**

Authors: Steven Price and Porter Lombard
In Proceedings 2nd International Cool Climate Viticulture and Oenology Symposium, Auckland, New Zealand 1988.
[A more detailed discussion than the previous article that includes a description of the data collected, figures and tables as well as results of the statistical analyses of the data.]

- **Estimating Yield for Wine Grapes.**

Authors: Sara Spayd and Robert L. Wample.
Practical Winery and Vineyard, March/April 1995.
[This is a discussion on the various factors involved in accurately estimating yield, more than it is a process for doing it. It includes discussion on the effects of planting density, bud fruitfulness, berries per cluster, etc.]

- **Estimating Vineyard Yields: Introduction to a Simple, Two-Step Method.**

Authors: Jim Wolpert and Ned Vilas.
American Journal of Enology and Viticulture, Vol. 43, No. 4, 1992.
[A table for determining sample size is given in order to determine the number of vines needed to estimate per vine cluster counts and the number of clusters needed to estimate cluster weight soon after veraison.]

Please mail me the complete set of articles on Predicting Yield in Winegrapes

I have included a Self Addressed Stamped Envelope affixed with $1.06 in postage.

Mail form below, and SASE to

UC Cooperative Extension

2604 Ventura Ave

Santa Rosa, CA 95492

Name:			Company:	
Street/P.O. Box:			City/State/ Zip	
Phone:				