

Research / IPM

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*Training Systems, Pruning Practices, and Soil Fertility Under Evaluation for Eutypa Dieback Disease Control in Lodi**

by Dr. Sanliang Gu, Ricchiuti Chair of Viticulture Research

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Eutypa dieback is a wood-infecting canker disease which poses a major economic threat to grape production worldwide. Although it may not grab immediate attention nor strike fear into every grower's heart like Glassy Winged Sharp Shooter and Pierce's disease, Eutypa dieback has been considered a significant problem for vineyard owners and managers trying to deal with the disease and its consequences. Control of the Eutypa dieback disease has been rated as one of the highest research priorities in California for years as indicated in the survey conducted by the American Vineyard Foundation.

Eutypa dieback is one of the most destructive fungal diseases of the woody tissue in grapevines. Symptoms may not be visible for 2-3 years after infection has occurred. Once the epidemic begins, the disease can increase to 90% incidence in some 20-year-old vineyards. Yield losses due to the disease range from 19-50% in vines expressing moderate symptoms and 62-94% in vines expressing

severe symptoms. In the early stages, Eutypa dieback causes loss of bearing surface by killing individual spurs. As the disease progresses, it forces retraining of new cordons. If left unattended, the disease will eventually kill the whole vine. Moreover, vineyard repair procedures must be repeated for a minimum of 2-3 years in order to eliminate infected vines within the vineyard.

Eutypa dieback fungus enters the vine primarily via pruning wounds during the rainy part of the dormant season when spores are released with rain water on the infected wood. Late pruning around budbreak is recommended to reduce Eutypa dieback infection. However, pruning at budbreak is not always practically possible with hand pruning for large acreage. Fungicides are available to protect pruning wounds, but chemical control is often time consuming and expensive with limited effectiveness. New approaches to Eutypa dieback control requiring low labor and chemical input is a necessity for the success of our winegrape industry in California.

Pruning wounds on vines



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traditionally trained to bilateral cordons with spurs are often times large. Conceivably, altering training systems and/or pruning practices to reduce the number of pruning wounds on the permanent wood, to delay pruning and avoid making cuts during the infection period, or to eliminate dormant pruning could lower the infection and development of *Eutypa* dieback. Mechanical pruning allows faster pruning at a very late date when susceptibility of pruning wounds to *Eutypa* infection is low. Comparable to late hand pruning, this method of pruning also exposes the pruning wounds to *Eutypa* infection for the shortest time possible. Minimal pruning, on the other hand, eliminates dormant pruning and leaves no pruning wound to be infected by *Eutypa* fungus. There is also a suspicion that vigor may be related to *Eutypa* dieback infection and development in grapevines. The disease incidence and severity would be altered if vine vigor could be manipulated by site selections for desirable soil fertility.

These facts serve as the foundation of a on-going research project in the Lodi winegrape growing region. Participating in a state wide effort and with support from the Lodi-Woodbridge Winegrape Commission, the American Vineyard Foundation, and the California State University - Agricultural Research Initiative, a team of researchers from California State University, University of California, and Growers in Lodi area are evaluating viticultural practices for improved control of *Eutypa* dieback. The study focuses on the long-term effect of training systems, pruning practices, and soil fertility on *Eutypa* dieback infection and development, vine vigor, petiole mineral nutrition, canopy light penetration, yield components, fruit composition and maturity, and chemical and sen-

sorial attributes of the resulting wines. Potentials and limitations of all the training systems and pruning practices are carefully examined. The research team, funding parties, and grape growers are hoping to identify training systems and pruning practices to assist in minimizing *Eutypa* dieback, reducing or eliminating crop loss, as well as maintaining high yield and wine quality at a much reduced production cost.

The experiment was initiated in 1992 with Cabernet Sauvignon grapevines on Freedom rootstock planted in Columbia silt loam (a high fertility soil) and San Joaquin loam (a low fertility soil). Training system and pruning practices under evaluation include bilateral cordon training with hand spur pruning, head training with hand cane pruning, mechanical pruning with hand follow-up, mechanical pruning without hand follow-up, minimal pruning, and Sylvoz (Hudson River Umbrella).

No visual symptoms of *Eutypa* dieback has been observed so far on minimally pruned vines, 10 years after vineyard establishment. On the other hand, symptoms of *Eutypa* dieback were first noted on bilateral cordon and Sylvoz trained vines with hand pruning in 1996, only 5 years after the vineyard establishment. Since then, incidence and severity of *Eutypa* dieback have increased almost linearly, reaching the strikingly high incidence (90% vines with symptoms) and severity (10 symptomatic shoots per vine) in 2001. Head trained vines with hand pruning showed a much lower percentage of vines with visual symptoms and fewer symptomatic shoots. Even lower incidence and severity of *Eutypa* dieback symptoms have been found on vines

mechanically pruned at budbreak. Vines grown on the soil of high fertility had greater incidence and severity of Eutypa dieback, although the difference is not as great as that among training systems and pruning practices.

Minimal pruning produced highest yield while head training produced lowest yield. Yield has not yet been impacted by Eutypa dieback in the vineyard even with high percentage of symptomatic vines on training systems such as bilateral cordon or Sylvoz with hand pruning. High fertility soil supported higher petiole N, Mg, Zn, Mn, Cu, and S but lower P and Ca content at full bloom, while training systems did not affect petiole mineral nutrition status that much. Training systems, pruning practices, and soil fertility all affected light penetration into the fruiting zone. Vines grown on the low fertility soil had a higher level of light in the fruiting zone from the top and south side of the canopy than those grown on high fertility soil. Minimal pruning and mechanical pruning allowed more light to penetrate into the fruiting zone. Fruit and must Brix, pH, and TA were statistically comparable among the treatments in most of the years. However, delayed maturity was observed in both mechanical and minimal pruning, much more so with minimal pruning. This may or may not have an impact on fruit composition and wine quality.

A higher total phenolics content was found in wines from low fertility soil. Preliminary sensory evaluation of the wines revealed better wine quality from fruit of mechanical pruning and head training with hand pruning, compared to the traditional bilateral cordon and other training systems. Since the viticultural practices under evaluation in this study change the canopy

structure and vine vigor, the quality of fruit and resulting wines will be continuously evaluated.

The investigators and cooperators of this research project wish to thank the Lodi-Woodbridge Winegrape Commission, the American Vineyard Foundation, and the California State University - Agricultural Research Initiative for their continued financial support; Vino Farms, Inc. for their help on vineyard management and data collection; and staff and students at the Viticulture and Enology Research Center for their administrative and technical assistance.

* Feature articles in the next series of IPM Newsletters will focus on research projects being funded by LWWC

Special Event for Spanish Speakers on Winegrape Pest Identification:

On July 18 from 8:00am – 10:00am there will be a field day on winegrape pest identification presented in Spanish by Mario Moratorio. The field day will start with a lecture on general winegrape pest identification and finish with participants going into the vineyard to identify pests. On hand will be pest specimens to view and there will be handouts in Spanish. Mario is a farm advisor in Yolo County and has worked for several years with the University of California Statewide IPM Program. Please spread the word of this event to your Spanish-speaking colleagues. This event will be hosted at Stanton Langes house, 20630 DeVries Road, Lodi. Please call Cliff or Lisa at the LWWC office with any questions about the event.

Calendar of Event

July 11: Wine Vision Working Task Force Meetings and Forum; 10:00am – 5:00pm Double Tree Inn, Rohnert Park. For more information call 707 255 9222.

July 12: Wine Vision Second Annual Members Meeting: American Wine in the 21st Century. Double Tree Inn, Rohnert Park. For reservations and more information call 707 255 9222.

July 18: Pest Identification and Monitoring Field Day for Spanish Speakers. 8:00am – 10:00am. Presented by Mario Moratorio, Yolo County Farm Advisor. Location: Stanton Lange's house, 20630 DeVries Road, Lodi. RSVP to Cliff or Lisa at 209.367-4727 by July 16.



*Find out about Bart Haycraft
in the Grower Profile!
(see page 3)*

Research/IPM Program Update

Lodi Woodbridge Winegrape Commission
Crush District 11
2545 West Turner Road
Lodi, CA 95242

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After a slow start due to cool weather following bud break this year, the shoot growth in the vineyards has been fast and steady. Powdery mildew pressure has apparently been fairly light and the dry weather seems to be helping. In general insect and mite problems haven't been a big worry either. However, the year has not been without its concerns. Energy supply problems, lower prices and more new acreage coming into production are raising questions of how good a year is shaping up. It seems the per acre crop load on most varieties and in most vineyards will be below normal. Lighter per vine yields, along with some frost damage in several areas of the state may slightly alleviate the statewide grape supply. With a normal or slightly below normal crop and the warm May, harvest may come early, which could be a challenge with all the new acreage.

What does seem to be sure about the current needs of the industry is quality will be on just about everyone's mind. In the past quality was only a consideration if increased prices were possible, but quality now can mean the difference between having a grape contact or not. The desire to do some cost cutting may help solidify the notion that in most cases a little less actually means more, in wine grape production. It seems there has been less irrigation than ever this year since bud break. At least less than I can recall, if you don't count the wet year of 1998, which was more European than California. As the season takes on a fair routine, leaf removal is wrapping up, mildew programs are in place and irrigation schedules begin; just a few thoughts. The biggest steps towards quality improvement in the district have been the adoption (sometimes seemingly slow) towards less applied water after budbreak. There have been

dramatic reductions in the rate of applied nitrogen and lower crop loads, which have made big differences in fruit and wine produced locally. In addition, improved planting materials and better vineyard design with new trellis systems and appropriate vine spacing have made area recognition for quality hard to ignore. The problem this year may be more in marketing and in costs than Mother Nature. The district recognition, economic benefits and quality of life which the local vineyards provide can hopefully help our legislators, regulators and urban neighbors appreciate the challenges you wine growers and vintners face in providing us all, a product and a way of life. A closing thought as many people begin to discuss the fate of the family farm on a more regular basis:



The cultivation of the earth is the most important labor of man. Unstable is the future of the country, which has lost its taste for agriculture. If there is one lesson of history that is unmistakable, it is that national strength lies very near the soil. Daniel Webster



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Grower: Bart Haycraft
Years in Winegrape Industry: 6
Acres in District: Oversees 3,000 acres
Varieties Grown: Chardonnay, Cabernet, Merlot, Pinot Gris, Zinfandel, Pinot Noir, Sauvignon Blanc

Bart Haycraft grew up in Dinuba, California and has always had a passion for agriculture. He is the Viticulturist and PCA for Sutter Home Winery in Lodi.

The former Navy Firefighter majored in Plant Science at Fresno State University. His wife, Amy, whom he met while at the University, also majored in Agriculture. After graduating in 1995, Bart embarked on a career as a PCA at Crop Care, a consulting company, in the Napa Valley.

Bart left his job at Crop Care after three years to take on his current position at Sutter Home Winery. Although his major responsibilities are pest control and overall health of the vines, he also manages cover crop planning and weekly fertilizer schedules as well as maintaining budgets for all the ranches. He is responsible for acreage in Lodi, Clements, Amador, and Los Alamos in Santa Barbara County, to which he commutes the farthest distance. "I am the luckiest guy in the company," he smiles, "because I live so close to where I work." Bart spends eighty-percent of his day in the vineyards. It didn't take me long to observe that he is a very well organized professional. He knows exactly what is happening in the vineyards he oversees and keeps excellent records for each of them. He admits, "The most difficult part of my job is keeping a balance between production and quality."

Bart is very interested in using sustainable agricultural practices whenever possible in preserving the environment. As part of his

efforts, he hosts many on-going projects and trials such as his current OLR trial he is working on with Chuck Ingels, the Sacramento County Farm Advisor, as well as seven separate herbicide trials, where they are focusing on quantifying herbicide residual and testing timing of the application. Bart uses a greenhouse located near the new Sutter Home Winery to raise beneficial insects for release in the vineyards.

While interviewing Bart, I had the opportunity to see the Twin Gyro in action while it sprayed vines with wettable Sulfur. Since he is concerned about any drift, especially near Interstate 5, he is happy with the operation of the Twin Gyro. The efficient two-row sprayer minimizes effects on the environment by lowering the number of chemical applications per acre and by reducing drift.

Bart is actively involved in grower community relations and seeks out opportunities to help the industry. He serves on the Winegrape Commission Research Committee and is involved with the Pest Management Alliance Program. And quite a number of people turned up at the field day he voluntarily hosted, "Under the Vine Weed Management." He is working jointly with Allison Berry on a LWWC funded cover crop project to evaluate the rate of Nitrogen that is assimilated through the vine.

The current owners of Sutter Home Winery are the Trinchero Family including Bob, Roger, and Vera, who Bart credits with making his job so enjoyable. According to his statements, not only are they all a big part of the grower community, they're a great family as well.

The new Sutter Home Winery located on the West side of Interstate 5 will be open in 2003.