

# Research / IPM

August 2001

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## Winegrape Irrigation Strategy Research in Lodi<sup>1</sup>

*Terry L. Prichard, Water Management Specialist, UC Davis.*

**T**raditional irrigation of winegrapes in the Lodi area has its roots in the table grape and bulk industry. The goal was to maintain good vine water relations during the season until harvest. During this time, when flood and furrow irrigation was the norm, precise control of water deficits was difficult. As the area moved from table grapes the practices were carried over to premium winegrapes. The result was generally vigorous vines with high yields and mediocre fruit quality. With the advent of micro-irrigation systems new irrigation strategies could be used to improve fruit quality. The Lodi - Woodbridge Wine Commission realized there was high quality fruit being grown and took the lead in supporting research to define irrigation strategies that when used in combination with other cultural practices produces truly fine quality fruit and in turn good wine quality. Terry Prichard, Water Management Specialist at UC Davis along with UC viticultural Farm Advisors in San Joaquin County Jim Kissler and Paul Verdegaal and more recently Chuck Ingels in Sacramento County have been pursuing the goal of improved fruit quality. The task of improving fruit quality has lead to research on irrigation strategies, crop load, canopy management and the use of cover crops.

### The First Experience

A trial was established in Cabernet Sauvignon on Dogridge west of Lodi. The objective was to determine if reduced irrigation would decrease canopy growth and to evaluate the effect of

water deficits on the fruit and wine. Irrigations were delivered by a full coverage micro-sprinkler system, which mimicked a flood system since about 4 inches of water was applied per irrigation. Treatments included a full irrigation treatment in which we measured vine water use between irrigations using a neutron probe. We irrigated other treatments so that they would use a total of 50% and 70% of the full water treatment. Additionally, in each of the 50 and 70 % treatments the timing of water stress treatments were evaluated by stressing early (pre/post veraison) and the other stressing later (post veraison). By the end of the season, both early and late stress treatments used the same volume of water. Results indicated the best combination of wine quality, control of vigor and yield occurred with 70 % of full water use when water stress was induced early season. Over a four-year period the average yield for this treatment was 8 tons per acre. Color density of the wine was doubled; the juice pH was lowered by 0.25, and the malic acid content as cut in half when compared to the full water treatment. An attempt to duplicate the irrigation strategy used required both measurement of soil moisture in the spring and fall in addition to using climatic information to account for the differences on each season. The result was a Volume Balance approach, which provided good results but was difficult to put into practical use.



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<sup>1</sup> This article continues the series of newsletter feature articles by researchers that have been funded by LWCC over the last several years

## New Technology

Building on our experiences in the Cabernet trial and wanting to evaluate the synergistic effect of crop load and canopy management, a Merlot and a Zinfandel trial were conducted. Both mature vineyards were on Freedom rootstock. Irrigation was provided by a drip system. During the cabernet trial, we tested the use of a device, which measures vine water status using the leaf called a pressure chamber or “pressure bomb.” We established the irrigation treatments based on the amount of vine stress before irrigation began. After irrigation began, the irrigation is parceled out to maintain a certain level of water stress. Levels were no stress (less than -10), -13, and -15 bars. Note the more negative the numbers indicate more water stress. We were generally unsuccessful in maintaining a constant water stress level using the timing and amount of irrigation due to the variable water use and climate conditions. A new plan was necessary.

We found it is easier and better to calculate a full vine water use using weather station data (CIMIS stations) that calculate the reference evapotranspiration (ET<sub>o</sub>) then apply a portion of that amount each week. As it turns out this strategy not irrigating until a threshold water deficit is reached then applying water on a weekly basis at a rate of 60% of calculated full vine water use has worked quite well in producing improved quality fruit and superior wines with little to no effect upon yield. Cover crops were used to deplete spring moisture causing threshold values to be reached sooner. Fruit and wine quality was enhanced by reducing vegetative growth of main and lateral shoots allowing more light into the clusters which improves both color and flavors.

### Adoption of Strategies

A Handbook titled “Quality Winegrape Irrigation Using Micro-Irrigation Techniques” has been drafted and is currently in the review stage. It will be available before next season to be used in a series of workshops. Workshops will cover results of these and other trials, different irrigation strategies resulting in: When to begin irrigation and how much to apply to achieve specific production/

quality goals.

These achievements were possible through the cooperation of grower cooperators, the LWWC and the Woodbridge by Robert Mondavi, E. and J. Gallo, and Sebastiani wineries.

## Special Event

### Introduction to the new LWWC Grower Resource Center

**O**n Wednesday, November 14 at 8:00am Cliff and Lisa will unveil the Grower Resource Center at the LWWC offices at 2545 West Turner Rd. After Nov. 14 the resource center will be open to all LWWC members during normal business hours. The center features the following: 1) A library of viticulture and enology books that can be checked out for a period of time; 2) Reprints of interesting and important articles relating to viticulture, pest management and sustainable farming practices; 3) A computer that can be used to view several databases of interest to LWWC growers and PCAs as well as to connect to the Internet. The following databases are: A pest monitoring database that has data for the past 6 years from the 60 BIFS vineyards distributed throughout the district; a database that can be searched to find out the different rootstocks grown by many LWWC growers and what they think of their performance; a photographic database with images of various viticultural topics; and a database to keep track of the library books. Cliff will demonstrate each one of these databases. So please plan to attend the event, see what is available to you as LWWC members and enjoy a cup of tea or coffee, and a donut or bagel. If you have any questions call Cliff or Lisa at 367-4727.

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**T**he 2001 harvest ends a year of contrasts, both for the season and compared to the recent past. Grapes are no longer in short supply and as expected that caused some marketing problems from the field to the delivery stand. The 2001 vintage holds a good potential for wine quality and further recognition of the Lodi district and surrounding areas, but competition for selling that wine will be tough and already has been seen in district prices to the grower. The challenge now more than ever is to not only maintain quality, but also increase it.

The vintage started early, but not any earlier than 1997. What was surprising was how fast all varieties came to maturity after an early start. Across varieties, sugars were high; rot incidence low, acid levels and pH good, colors excellent and fruit flavors very good. Crop yields are generally below average, but total production probably was the same as last year or even up due to the new acres coming into production. The lower crop levels helped speed up harvest even beyond what would be expected for an early start. Several factors seem to have increased the rapid ripening this year. Besides the lower crop and early start, there was a very dry December, a cold spring start, then hot bloom time temperatures, alternating periods of cool and hot during the season also seemed to help speed things along. Powdery mildew and rot problems seemed to be in check, but mites did flare up late season. Overall, conditions seemed to provide the opportunity for very good to excellent fruit quality.

As for the harvest start, no one seems to remember when so many varieties have been ready for harvest at the same time, even more so than 1997 or 1999. Chardonnay, Zinfandel, Cabernet Sauvignon, Merlot, some Sauvignon blanc and Syrah closely overlapped during harvest. Red Zinfandel blocks were harvested in mid to late August! Cabernet Sauvignon was harvested before Colombard reached maturity. The harvest

was hard to keep up with this year, but wine quality could rival the 1999 vintage. Although prices ranged from the same as last year to down or even rock bottom, it depended on variety, vineyard site and winery.

With the economic pressure of downward pricing, it becomes tempting if not necessary to consider cutting corners. The danger is that it is all too easy to negatively affect quality, which in turn can force prices even lower. Fortunately for wine grapes they don't require the inputs that other crops do. This past year was a good example with irrigation management. Deficit irrigation is becoming a more common practice, which was good for quality and saved some money, as electricity prices skyrocketed this year. I did see some inadequate irrigation, along with the more common problem of over irrigation this year. Less water is generally better, but attention to meet vine needs is still important. Following a reasonable irrigation schedule using ET demand and either newer technology such as pressure bombs or just monitoring actual hours and amounts of water application will help take some of the mystery about vine water use. We should have a good and easy to follow program for the coming year from Terry Prichard (U.C. Extension Specialist), based on the local work he had done.

Other year end considerations include: evaluating your fertilization program, problem soil conditions, vine balance by measuring pruning weights (see LWWC Newsletter December 2000), identifying leaf roll infected vines for removal and irrigation system evaluation for uniformity. Each one of these items is a discussion by itself. There is still time left to consider these before leaf fall or during dormancy. Talk to your PCA and/or winery field rep about some or all of these concerns as time allows over the next year. I will also try to cover each of these subjects during the coming months. We are in more difficult times now, but quality doesn't need to nor should suffer as the district continues forward.

By Paul Verdegaal  
UC  
Viticulture  
Farm  
Advisor

# Calendar of Events:

**Nov. 8:**

Integrity Awards Dinner, 6:30 pm at Hutchin Street Square. For more information contact LWWC at 209.367.4727.

**Nov. 14:**

Wednesday: 8:00am-9:30am. Introduction to the new LWWC Grower Resource Center at the Lodi Wine and Visitor's Center. 2545 West Turner Rd., Lodi

**Dec. 12:**

Thursday: 8:00am-9:30am. Pruning demonstration and measuring crop to pruning ratios by Paul Verdegaal, University of California Viticulture Farm Advisor. Gallo-Liberty vineyard, corner of Acampo and Kenefick Rds., Acampo.

**Jan 29-31:**

Unified Wine and Grape Symposium, Sacramento Convention Center.

**Feb. 5:**

Lodi Grape Day

## Come and attend a *Lodi Winegrower's Workbook* Workshop

Now that harvest is over we are once again organizing workshops to introduce LWWC growers and PCAs to the *Lodi Winegrower's Workbook*. When you attend a workshop you receive a copy of the workbook and instructions and guidance on using and filling it out. Last year 22 workshops were held and attended by 160 growers and PCAs where they received their copy of the book. The workbook has also captured the attention of many winegrape growers throughout California, from other parts of the US and even overseas. As a result we have sold almost 200 copies of the workbook to people outside the district. Furthermore, the Wine Institute and the California Association of Winegrape Growers have begun a statewide project based on the *Lodi Winegrower's Workbook*. If you are interested in attending a workbook workshop and receiving a copy of the book please call Lisa or Cliff at 367 4727.

### Research/IPM Program Update

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

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Grower: Jerry Fry

Years in Winegrape Industry: 36

Acres in the District: 700

Varieties grown: Zinfandel, Alicante, Cabernet, Chardonnay, Merlot, Savignon Blanc, Sangiovese, Malbec, Petite Sirah, Viognier

*"The bedrock of the ag community, "is a suitable description of Jerry Fry, who sees growing winegrapes as a "way of life".*

In 1852 Jerry's great grandfather, Cornelius Mohr, traveled to America on a whaling ship that originated from Germany and stopped for supplies in San Francisco. Instead of continuing on to Alaska with the ship, he stayed in San Francisco where he worked on farms and eventually bought his own piece of the American dream, a portion of a Spanish Land Grant in Mt. Eden. Jerry was raised at the original homestead where his mother was born and grew up farming row crops for the family's Ranch. The family's farming name, Mohr-Fry Ranches, is a combination of his mother's maiden name Mohr and his father's surname.

In the mid 1950's due to urbanization, high taxes, and operating expenses, the family began moving the farming operation to Lodi. Jerry's sisters are also currently working for the ranch, and Jerry's mom, who is now 88, and resides at the homestead, is still President of the family corporation.

Jerry grew up in Mt. Eden and had the same first grade grammar school teacher as his mother and sisters. He attended San Lorenzo High School then attended Cal Berkley from 1959 to 1961, where he met his wife Peggy. The couple transferred to UC Davis, and Jerry earned his B.S. in Soil Science and a Masters degree in Soil Physics. Peggy's degree is in Psychology and she also earned an elementary teaching credential at UC Davis.

Jerry and Peggy were married in 1963 and in 1965 moved to Lodi where the family had purchased orchards and vineyards which included cherries, Tokays, Palominos, Alicantes, and Zinfandels, a part of which was planted in 1901. Shortly

thereafter, they started their family and are now the proud parents of three grown sons, Jay, Oscar and Bruce.

I enjoyed talking with Jerry about the sustainable practices he uses in the vineyards and his talent for looking five to ten years into the future. Along with the usual sustainable practices, including leaf pulling, monitoring for pests, replacing residual herbicides with contact herbicides, Jerry continuously experiments with other sustainable practices including cover crops. The bulk of the vineyards were planted in the 1940's. Conventional cultural practices including furrow irrigating for so many years has compacted the soil, so Jerry plants rye in the winter as a cover crop. The deep root system of the rye works naturally to loosen the soil and also increases organic matter. Jerry was the first grower in Lodi to use an ASV Posi-Track in the vineyard. The "rubber track crawler" is manufactured by Snow-Cats. Jerry was also the first to use the gypsum solution injection machines to add gypsum to the soil during irrigation to improve water penetration. The vineyards are also "fertigated" with the solution machines.

In addition to soil compaction challenges, the unevenness of the land contributes to stressed vines and increased mite infestations. To combat these problems, in both the old and newly planted vineyards, Jerry uses subsurface drip irrigation. With this method, Jerry has also successfully reduced the problems caused by coyotes, and controlled weed growth in the family vineyards. Fertilizer distribution is much more uniform because it is being delivered directly to the root system, and the quality of fruit has improved.

With such a love for farming Jerry has, "never gotten up in the morning and not wanted to go

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to work.” He enjoys agriculture and working with other growers. Jerry believes that the growers in Lodi are “solid and progressive farmers.” And he is quick to add that his own farm workers are “hard working and loyal.”

To Jerry, the most frustrating part of farming is not knowing the level of damage his crops and vines are going to have because of pests, fungi, rains, frost or heat. Farmers work very hard all year and in one day their crop and/or vines could be seriously damaged by harsh weather.

Jerry has made quite a number of achievements in the wine grape growing community. He received the Lodi-Woodbridge Award of Merit for the year 2000, and was inducted into the San Joaquin County Agriculture Hall of Fame in November of 1999. Jerry was an organizer, chapter director and past president of the California Association of Winegrape Growers and the Lodi District Grape Growers, and past board member and marketing committee chairman for the Lodi-Woodbridge Winegrape Commission. For ten years he has been a US delegate to the International Office of Vine and Wine Annual Conference in places as faraway as USSR, Argentina, South Africa, France, and Germany. He is also a current member and past president of the Lodi Rotary Club. Jerry was also a director, chairman and a volunteer fireman for 25 years with the Woodbridge Fire District. Recently at the Sacramento State Fair the family received the prestigious 100-Year Club Member Award for the Mohr-Fry Ranch, for being in operation for over 125 years. The Mohr-Fry Ranches has hosted a *Lodi Winegrower’s Workbook* workshop, and has fourteen acres of wine grapes in the BIFS program.

Jerry has done a remarkable job in advancing the Lodi name on wine labels. He is very dedicated to growing premium winegrapes which are sold to over a dozen wineries statewide. Jerry is committed to helping the

Lodi district grow together as a community and is a very active supporter of the Lodi-Woodbridge Winegrape Commission.

He remembers a saying by one of the older members of his Rotary Club, “There are only two kinds of people in this world, Lifters and Learners.” Jerry hopes he will be remembered as a "Lifter".