



## Highlight of the Month: Regulated Deficit Irrigation

*Regulated deficit irrigation (RDI) means applying less than the full potential water requirement on vines with a drip irrigation system to achieve properly timed mild water stress. The results are improved wine quality and conservation of water and energy.*

### Diageo Introduces RDI Grower Program

Diageo Chateau and Estate Wines started offering a regulated deficit irrigation (RDI) program in 1999 to many of its growers throughout California. Diageo believes that wine quality can be vastly improved by managing irrigation to create mild water stress on the vines from early season through berry set, and continuing it at a moderate level through harvest.

The road to this thinking began in 1997,



explains Diageo Senior Winegrowing Manager Bryan Osborn. One of Glen Ellen Winery's

Cabernet Sauvignon vineyards was too vigorous and produced grapes with vegetative character that lacked color and body. Diageo hired irrigation consultant Dale Handley to apply the RDI method on this acreage.

"RDI completely turned around the vineyard, and wine quality dramatically increased," says Osborn. By irrigating according to the water status of the vine, Glen Ellen Winery's grower

forced the vineyard to undergo mild early season stress. This resulted in creating balanced vines with a controlled canopy that let in more light for ripening, yet protected the fruit from sunburn, explains Osborn.

The wines were less herbaceous and displayed better tannins, body, color and flavor.

After seeing these results and reading RDI research, Diageo incorporated RDI into its standard operating procedure for all of its brands—Blossom Hill, Glen Ellen Winery, M.G. Vallejo, Sterling Vineyards, The Monterey Vineyard and Beaulieu Vineyard. Today, more than 50 percent of Diageo's red grape acreage is on an RDI program. They believe it is an excellent tool for red wine and for fully developed vineyards that are producing their third or fourth crop. The method is reserved for more mature vines.

Diageo then worked with its contract growers to adopt the program by offering to pay for the

services of the irrigation consultant the first year. In exchange, growers bought the pressure chamber equipment, used it to take readings on the water status of the vines, and interpreted results with the consultant. Diageo initially offered the program to selected growers in Lodi, the Delta and Central Coast and expanded the program to Napa and the Southern San Joaquin Valley the following year. "It's been a win-win

Photo courtesy Diageo Chateau & Estate Wines



Deficit irrigation improves wine quality by creating canopy that is balanced to the fruit.

Please share this newsletter with your entire staff. It is also available online in pdf format on Wine Institute's web site at: [www.wineinstitute.org/communications/highlight/DeficitIrrigationMar2002.pdf](http://www.wineinstitute.org/communications/highlight/DeficitIrrigationMar2002.pdf)

### Benefits of Drip Irrigation and RDI:

- Conserves water, using only what is necessary
- Reduces water costs
- Produces more uniform, healthier vineyards
- Gives more control over how much water to apply and when
- Can lessen run-off
- Provides additional method for applying fertilizer (by injection)
- Can diminish leafhopper pressure and disease, such as bunch rot, mildew and botrytis
- May decrease need for fungicides and pesticides
- Assists in producing smaller berries, increasing skin to juice ratio
- Helps reduce foliage for more light and air in fruiting zone
- Discourages of shoot tip growth, stimulating vine to mature seeds and flavors for a less herbaceous wine
- Can quicken ripening of grapes if water flow is increased slightly after veraison
- Improves wine quality

### Potential Trade-offs of Drip Irrigation and RDI:

- Investment of time and money to install drip system
- Need for constant monitoring and maintenance of drip system
- More responsibility to schedule irrigations efficiently and to change scheduling according to weather variations and vine response over time
- Clogged emitters can take away any benefits
- Water pressure drops could increase pumping and impact power bill
- May have slight negative effect on yields for some varieties
- Could increase mite pressure

situation for everybody,” says Osborn. “Our growers reduce their expenses through less water and energy use. Some comment that they save 35 percent on overall power costs. Also, the smaller canopies allow them to make fewer tractor passes. One grower eliminated three hedging passes by using RDI. In the end, growers haven’t been hurt financially. They are retaining yields, not losing more than 10 percent, while gaining higher fruit quality.”

## Conserving Water at the Hess Collection

In the mountain vineyards of the Hess Collection Winery in Napa, there is what could be called natural regulated deficit irrigation. The thin soils of Mount Veeder retain less moisture. Wells are few and far between, and reservoirs filled with only winter run-off are the main source of water for the vineyards.

“Water conservation is critical because we simply have less water up here. We would actually plant more vineyards if there were more supply,” says Randle Johnson, vice president of winemaking and strategic planning at Hess Collection. “Regulated deficit irrigation (RDI) helps us conserve the natural resources that we have.”

Equal to conservation reasons is gaining higher winegrape quality, explains Johnson. RDI produces smaller fruit with more concentrated flavors for their 350,000-case production. It’s now

practiced on all of the winery’s 1300 acres at Mount Veeder, Pope Valley, American Canyon and Monterey. Another dozen of their contract growers also irrigate for quality with RDI principles.

according to the water status readings with the pressure chamber. The fruit quality of that vineyard was eventually upgraded, so that the wine was moved from a good-value label to the winery’s estate-bottled ultra-premium wine.

Johnson says Hess Collection has been practicing RDI since 1998 with the hiring of a vineyard consultant who emphasized RDI and water status readings with a pressure chamber. Research by Terry Prichard and Larry Williams at UC Cooperative Extension also fueled their interest in this sustainable practice.

Johnson, however, says the driving force for the winery’s emphasis on sustainability is owner

Donald Hess. Hess’ influence stems from his native Switzerland, where in the mid-1980s, ecological sensitivity prompted the Swiss to develop a complete sustainable viticulture program for the country’s 37,000 acres of vines. The Hess Collection practices RDI as just one of many sustainable methods used in all of their vineyards.

Photo courtesy Hess Collection Winery



Randle Johnson of Hess Collection Winery takes a water status reading with pressure chamber equipment.

Hess Collection also found that the pressure chamber equipment, used to check the water status of their vines for practicing RDI, could help identify special problems, such as the emergence of a deep natural spring in a vineyard. A spring was causing excessive vigor in one of the vineyards. They adjusted their irrigation practices

## *Beringer Blass Researches RDI on the Central Coast*

In the late 1980s, the experts at Beringer Blass Wine Estates knew that irrigation in some Central Coast vineyards had to be cut down. The red wines were displaying green, vegetative character.

“We advised our growers to stop excessive irrigation,” recalls Don Ackerman, viticulturist for Beringer Blass Wine Estates’ 5000 acres on the Central Coast. Excessive shoot growth was shading the grapes and diminishing the fruit flavors, he explained. Limiting the irrigation from berry set to coloring kept the berry size small and concentrated the flavors.

Beringer was doing regulated deficit irrigation more than a decade ago, but it wasn’t labeled that until irrigation specialist Terry Prichard published his research on the subject in the late 1990s. His scientific studies confirmed what the winery staff believed had improved the wines. “In an effort to limit the excessive vegetative growth at some of our vineyard sites we made significant adjustments to our irrigation practices. The results we experienced jibed with the later experimental work.”

“The main driver for our program is wine quality,” says Ackerman. Since all the winery’s vineyards had drip irrigation lines, the transition to RDI was

mostly a change of mindset. In the past, watering was done early in the season to jump start vine growth, then tapered off after the berries gained color to promote sugar accumulation. RDI reduces the early season irrigation to control canopy and intensify color and flavor. The goal now is to produce a grapevine where the crop size and vegetative growth are balanced. This balance is gauged through visual assessments of shoot density and shoot length.

UC irrigation specialist Larry Williams has been tracking how RDI enhances the wine quality in Beringer’s coastal vineyards. Wine is made from these grapes at Beringer’s experimental winery and evaluated by a trained tasting panel. Wine from an RDI

research block is being measured for depth of color with a spectrophotometer.

The water conservation also has been important because most of the winery’s irrigation water comes from wells. RDI is a natural fit with coastal winegrowing—frugal because of the limited water supply. Ackerman says the winery can save an average of 25 percent in water and energy costs with RDI, depending upon the weather.

“We’re really pleased with the results and quality of wines,” says Ackerman. “We share our information with growers. Those who are interested in the highest quality are willing to give up a small percentage of yield for that quality. It’s been worth the quality pay-off for both of us.



Don Ackerman of Beringer Blass Wine Estates evaluates the quality of Cabernet Sauvignon produced from an RDI vineyard on the Central Coast

### **Resources:**

- ◆ **University of California Cooperative Extension: Land, Air and Water Resources—** Publications: Prichard, Terry. “Imposing Water Deficits to Improve Wine Quality & Reduce Costs.” Also: “Effects of Water Deficits upon Winegrape Yield & Quality.” [http://cesanjoaquin.ucdavis.edu/Custom\\_Program/Current\\_Publications.htm?\\$\\$=717](http://cesanjoaquin.ucdavis.edu/Custom_Program/Current_Publications.htm?$$=717)
- ◆ **University of California, Davis, Irrigation Education Material—**<http://lawr.ucdavis.edu/irrigation/index.htm>
- ◆ **Center for Irrigation Technology, California State University, Fresno—** <http://cati.csufresno.edu/cit/index.html>
- ◆ **Irrigation Training and Research Center, California Polytechnic State University, San Luis Obispo—** [www.itrc.org](http://www.itrc.org)
- ◆ **California Irrigation Management Information System Service (CIMIS)—** helps growers develop water budgets. CIMIS’ network of 100 computerized weather stations provides data to help calculate evapotranspiration. [www.cimis.water.ca.gov](http://www.cimis.water.ca.gov)
- ◆ **Practical Winery & Vineyard.** November/December 2001. Williams, Larry E. “Irrigation of Winegrapes in California.” [www.practicalwinery.com](http://www.practicalwinery.com). Go to “Back Issues.”



# THE CODE OF SUSTAINABLE WINEGROWING PRACTICES



In early 2001, leadership and funding from Wine Institute and the California Association of Winegrape Growers (CAWG) led to the formation of a subcommittee to develop a “Code of Sustainable Winegrowing Practices.” This proposed voluntary program, establishing statewide guidelines for sustainable farming and winemaking, is still under development and is expected to be introduced to the wine community within the coming year.

**Purpose:** The purpose of the project is to enhance the California wine industry’s leadership role in responding to pressures resulting from population growth, public and legislative attitudes, environmental decisions from regulatory and governmental bodies, and other growth-related issues. The new Code, and its implementation, can greatly augment the industry’s collective and unified ability to accommodate these pressures, while assuring that future generations can produce the finest world-class wines. The goal of the Code is to “promote farming and winemaking practices that are sensitive to the environment, responsive to the needs and interests of society-at-large, and economically feasible in practice.” In a recent address to Wine Institute’s Board of Directors John De Luca characterized the proposed Code as “most likely the greatest legacy we can create for the wine community, our larger society, and generations yet unborn.”

**Project Status:** Close to 50 Wine Institute and CAWG members, as well as outside stakeholders such as representatives from Cal/EPA and independent farm advisors, sit on the subcommittee spearheading the project. Subcommittee Chair Michael Honig leads work on this first-ever statewide initiative, which will include a system to measure the voluntary industry input from vineyards and wineries. The data collected from the project will be used to benchmark the wine community’s progress on sustainability and target educational campaigns where needed. The winegrowing portion of the guide book will build upon the successful programs of the Lodi-Woodbridge Winegrape Commission and the Central Coast Vineyard Team. Feedback from regional grower and vintner associations and a wide range of academia, environmental and social equity communities has played an important role in the Code development. Dr. Jeff Dlott of RealToolbox, a sustainable agriculture and resource conservation consulting firm, has been contracted to help oversee the project and measurement system.

**Next Steps:** In March 2002, the Wine Institute Board of Directors provided comment and approved a 150-page draft of eight chapters representing half of the guidelines for the Code of Sustainable Winegrowing Practices. The subcommittee and Institute staff are now going forward to obtain outside review of the approved chapters by environmental groups, university educators, regulators and other industry experts. The remaining chapters are being developed and a complete draft of the Code is planned for presentation at the Annual Meeting in June 2002.

To attract additional implementation funds for this project, the Wine Institute Board also approved the establishment of a 501(c)3 nonprofit, non-lobbying foundation in conjunction with the California Association of Winegrape Growers. This was necessary as many philanthropic organization donate solely to 501(c)3 groups. Named the California Sustainable Winegrowing Alliance, this entity will help advance the adoption of sustainable viticulture and winemaking practices through research and education. For more information on the project, go online to [www.wineinstitute.org/communications/SustainablePractices/vision.htm](http://www.wineinstitute.org/communications/SustainablePractices/vision.htm)

Upcoming topics for “Highlight of the Month” publications are as follows.  
For information, please call the Communications Department at 415/356-7520.

- April – “Leaf Pulling and Pruning” \*      ● May – “Wildlife Corridors and Habitat” \*
- June – “Communicating with Neighbors”      ● July – “Increasing Predators and Scouting Pests” \*
- August – “Assessing and Reducing Energy Needs” \*      ● September – “Composting” \*
- October – “Controlling Erosion” \*      ● November – “Protecting Air and Water Quality”
- December – “Attracting and Retaining Good People”

\* Topics of a seasonal nature are matched to the time of year when the practice takes place.

The practices for “Regulated Deficit Irrigation,” highlighted in this issue, pertain to the Code of Sustainable Winegrowing Practices in the following areas: Viticulture; Pest Management; Water Management; Water Conservation & Water Quality; Energy Efficiency; Wine Quality.

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