

## Wine grapes go green:



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## THE SUSTAINABLE VITICULTURE STORY

Wine grapes and wine are among California's signature products, and they fuel a powerful economic engine in the state. Each year, 20 million tourists roam the state's wine regions, tasting, purchasing and taking in the beauty of the landscape. California, which produces 90% of the nation's wine supply, generates revenues of \$19 billion a year for wine and wine grapes alone. The full economic impact of California wine is \$51.8 billion a year.

However, the story of California viticulture — and particularly the story of sustainable wine-grape growing — is about more than productivity, wine country tours, or dollars and cents.

Beginning in the early 1990s, winegrowers worked together to make groundbreaking commitments to agricultural-environmental partnerships. They invested time, money and energy in adopting sustainable practices — sustainable not only in terms of the bottom line, but in terms of California water, soil, wildlife, conditions for workers and community-farmer relationships.

Wine grapes are cultivated on some of the most sensitive acres in the state, in areas of high population growth, high land values and environmental activism. Vineyards are part of scenic landscapes prized by Californians; they border urban and suburban development, and they are adjacent to abundant and diverse wildlife.

Growers and winemakers realized early that they could have a positive impact on this environment and their employees, and that their credibility in the wider community, outreach to neighbors, and market reputation would be strengthened through efforts to establish sustainable practices. Through early adoption by groups such as the Lodi Winegrape Commission (page 142), the Central Coast Vineyard Team, the Napa Sustainable Winegrowing Group, Fish Friendly Farming, and later through the statewide Sustainable Winegrowing Program created by the California Association of Winegrape Growers and the Wine Institute, they have promoted sustainability both in the vineyard and the winery. Their innovative efforts are now prototypes for other commodities.

**Research promotes sustainable practices.** Decades of UC research and extension have helped to facilitate sustainable viticulture. Growers applied years of research results to the

specifics of their local production regions (see page 127). They implemented leaf removal and canopy management to control several key pests such as *Botrytis* bunch rot, sour rot complex, powdery mildew and leafhoppers; they used cover crops to improve year-round vineyard access, reduce soil erosion and encourage populations of natural enemies of pests. They adopted integrated pest management methods, using economic injury thresholds and weather data, as well as models of disease risk forecasting, to reduce pesticide use. For instance, growers were able to sharply cut their use of sulfur and other pesticides to control powdery mildew, the disease that spurs the bulk of pesticide use on grapes.

By 2006, statewide reports showed that total pesticides applied to wine grapes had declined 50% per acre planted since 1994 (see page 133). Also, according to their self-assessments, growers reduced sedimentation and pesticide pollution of water, managed dust and improved air quality, and reduced herbicide and fungicide use.

But the drive for sustainability is not over. The competitive global marketplace, continued population growth, global climate change, scarce natural resources, the need for new technology and human resource skills — all make UC research, from basic to applied, even more important if industry is to continue innovating and adopting best practices. Evidence of this ongoing work fills this special collection: work on stream-flow models to ease irrigation impacts (page 148), biological and chemical control of mealybugs and ants (pages 167, 177), improved techniques for the detection and elimination of grapevine viruses (pages 156, 161), vineyard floor management and use of cover crops (page 184, 191), and tailoring fertilization to cut costs and reduce nutrient pollution in runoff (pages 195, 202).

These examples — all involving long-term funding, commitments by distinguished scientists, collaboration across disciplines, use of UC facilities and infrastructure, and partnerships with industry — are at the heart of wine-grape sustainability. This work has taken place at a time when public funding for agricultural research has been steadily declining for years. In most cases, it was made possible by a combination of public and private funds.

**Public-private partnerships.** Other recent milestones in public-private partnerships include the UC Davis Robert Mondavi Institute for Wine and Food Science, first established in 2001 with a \$25 million gift from winemaker Robert Mondavi. In 2004, California voters funded \$33.6 million for construction of the institute's academic building, and more private gifts followed. In summer 2008, the departments of Viticulture and Enology, and Food Science and Technology moved in. In June 2009, construction will begin on a teaching and research winery and the August A. Busch III Brewing and Food Science Laboratory, entirely funded with private donations.

Another \$12.5 million donated to UC Davis by the Rossi family will endow faculty positions focused on grape-growing and winemaking, and will fund work

on sustainable viticulture and enhancing the flavor of grapes and wine.

The Pierce's Disease/Glassy-Winged Sharpshooter Program, funded by industry, federal and state dollars, has fostered dramatic findings that could someday lead to prevention of this fatal bacterial illness of grapevines (page 127). In the last 10 years, about \$36 million has been awarded in competitive grants reaching across the UC system, the United States and the world. Resulting UC research has made strong advances toward disease-resistant vines, and in another case has elucidated a signal molecule that could be used to suppress the virulence of the pathogen and offer substantial disease control.

A broad public-private coalition brought about success of another kind in the 2008 Farm Bill. Thanks to a unified effort across commodity groups and the research community, millions of dollars are now being invested in specialty crop initiatives at USDA and through state-run block grant programs.

The Farm Bill contains other big wins that directly benefit the grape industry and move it closer to sustainability, including the National Clean Plant Network (the grape portion of which will be headquartered at UC Davis) and pest and disease programs to step up detection and surveillance activities, and identify and mitigate new threats from invasive species. Without a united message from industry and the land-grant universities, none of this would have been possible.

**Funding needs.** Despite these successes, the funding currently available for grape and wine research is no longer sufficient to support needed projects in an increasingly expensive research environment, or to meet matching-fund requirements for new Farm Bill research programs. Many key types of research cannot be accomplished without large, multidisciplinary research teams, advanced instrumentation and updated laboratories, in addition to technicians and field trials. All require long-term funding commitments. Furthermore, competition for researchers has also become global; the United States is losing valuable individuals in the wine research community to positions in institutions around the world where their research will be better supported (often with government investment). Real and substantial increases in funding are needed to improve our position in California. That research must involve collaboration between disciplines and integrated investigations from the basic to the applied.

Sustainability is about meeting the needs of the present without compromising the livelihood and needs of future generations. Today's robust viticulture industry is the result of visionary leaders willing to make investments for the future and create partnerships between UC research and extension, and growers and vintners. Building on this past success, diverse stakeholders are exploring ways to ensure a vital research infrastructure is adequately funded to meet our current challenges and the needs of upcoming generations. The future depends on it!