

IMPACT

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IMPACT is a series of publications highlighting how UC Davis' College of Agricultural and Environmental Sciences makes a difference in the lives of Californians. Through research, teaching and outreach programs, UC Davis research touches almost all aspects of Californian life. Today, millions of people eat safer foods, breathe cleaner air and drink healthier water with the help of our researchers. We're making discovery work -- for California and the world.

CULTIVATING CALIFORNIA'S VINEYARDS

THE ISSUE

The University of California, Davis, has been a historic partner to California's wine industry. Now, with the help of industry innovations and university research, California's wines are equal to the world's best in quality, diversity and flavor. UC Davis' program in viticulture and enology -- the study of grape-growing and winemaking -- is a major reason for this success.

Early work at UC Davis involved identifying the appropriate grape varieties and clones best suited to California's climate and to creating the technology to assure the production of good wine. One key innovation was controlled-temperature fermentations, which has greatly enhanced white wine quality. By the late 1950s, UC Davis had learned to manage the bacteria that cause wine spoilage. Now, winemakers finally were able to chemically control the process for different flavors and quality.

In the past 25 years, more than 1,000 people graduated with UC Davis viticulture and enology degrees, and today many top U.S. wineries boast a UC Davis graduate as winemaker or manager. Increasingly, the globe's greatest wine regions, including Australia, France, Italy, Spain, South Africa, Argentina and Chile, send their wine progeny to study at UC Davis.



WHAT WE'RE DOING

UC Davis researchers are engaged in an ongoing battle against the devastating plant diseases that plague California's vineyards. Plant pathologists and viticulturists are working to control Pierce's disease -- a bacterial disease transmitted by the glassy-winged sharpshooter -- which threatens California's wine, grape and raisin industries.

Another challenge is phylloxera, the root louse responsible for killing grape vineyards and costing California more than \$1 billion in damage over the last decade. Bruce Kirkpatrick, professor of plant pathology, and Andy Walker, associate professor of viticulture, are researching how to breed grapevines to resist disease.

UC Davis scientists are studying two other grapevine diseases that have grown increasingly troublesome to California wine-grape growers. Black-foot disease and young grapevine decline, nicknamed “Black Goo,” are both characterized by a slowdown in growth, smaller trunk size and a reduction in foliage. Developing disease-free plants is a major goal at UC Davis.

RESEARCH IMPACTS

Beyond controlling diseases, researchers have improved viticulture and enology in a number of ways:

Grape parentage. DNA “fingerprinting” research by Professor Carole Meredith has traced the origins of some of the world’s leading wine grapes, including Zinfandel, Chardonnay and Cabernet Sauvignon.

Health benefits. Professors Susan Ebeler and Andrew Waterhouse have studied how phenolic compounds in both red wine and chocolate act as antioxidants to prevent coronary heart disease and possibly cancer.

Aroma wheel. Professor Ann Noble’s sensory research led her to develop a wine aroma wheel that helps amateurs and professionals alike discuss wine characteristics using standard terms such as buttery, oaky, berry flavored and citrus scented.

Winemaking technology. In the 1970s and ‘80s, researchers developed new processes and equipment to improve the composition of wines, reduce the usage of energy and water, minimize waste output and enhance efficiency.

Wine quality. Researchers are working to better understand how winemakers can produce their own desired flavors and aromas. This has allowed the industry to move beyond mere commercial acceptability to the production of intricately crafted fine wines.

Fermentation. Incomplete or “stuck” fermentations remain a major concern for wineries nationwide. Professor Roger Boulton has studied the chemical engineering aspects of wine processing as a way to predict wine quality and prevent fermentation problems.

A SHARED VISION

“It has been said with some truth that the scientific knowledge of grapes and wines advanced more in the three decades after World War II than in the preceding 2,000 years,” writes wine authority Charles Sullivan in *A Companion to California Wine*. “During those 30 years, the University of California, Davis, became the world’s leader in the acquisition of this knowledge.”

Reflective of this global impact, the developing Robert Mondavi Institute for Wine and Food Science at UC Davis will become a catalyst in the research and teaching of viticulture and enology. By locating the Department of Viticulture and Enology and the Department of Food Science and Technology under one institutional roof, UC Davis lays the foundation for scientific progress in the wine sciences.

That’s impact -- science and communities at work together.

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