

Update

California State University, Fresno

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Students' efforts key research success

A small company of Fresno State viticulture and enology students has found that summer vacation may provide a break from studies, but little time away from academic work.

That's because they are employed as full-time research assistants on projects directed by Ph.D.-level faculty and staff of the Viticulture and Enology Research Center (VERC). Some of the students' work is supporting research that may prove significant for San Joaquin Valley wine grape growers in the years ahead.

Case in point: Graduate student Erik Mallea is assisting viticulture research specialist and professor Sanliang Gu in a study of the application of abscisic acid (ABA) to red wine grapes to enhance color development (see article on Page 5). According to standard wine-making protocols, richer color in the grape at harvest means richer color and flavor components in the resulting wine.

A traditional problem in California's San Joaquin Valley has been high summer

Field, laboratory work provide full-time summer employment for those pursuing academic degrees

temperatures which often exceed the optimum for color development needed for high-quality wine, Gu said.

"It is well-established that ABA application improves color development and fruit ripening in grapevines," Gu stated. The obstacle to commercial use has been the price of ABA. Until recently the complex compound cost up to \$1,000 per gram – far too expensive to use for spraying vines. Advances in production methods, however, have greatly reduced ABA costs. Suddenly it's an option for consideration, and many in the industry are interested.

As one of the leaders of the student

technician group, Mallea finds himself right in the middle of ABA research, managing chemical applications, berry sampling and other aspects of the project. The importance of the work, however, doesn't necessarily fill it with nail-biting intensity. In most cases, sound scientific research simply means hours of routine data collection and analysis, in the field and in the lab, day after day, month after month, sometimes year after year.

A typical day for the student research assistants may involve work on several research projects, Mallea said. Duties include leaf sampling, berry sampling, and cane sampling in the field; taking dozens, hundreds or more samples over multiple days and weeks. Samples are usually brought to the lab for analysis – under a microscope, or through a variety of chemical

See Students, Page 5



Above: From left, student research assistants Sean Jacobs, Brodie McCarthy and Erik Mallea pull grape berry samples for later laboratory analysis. Left: Close-up of individual berries being selected from cluster.

C A T I



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Measures sought for black widow control

Supermarket findings bring renewed attention to populations in table grape vineyards

Reports of black widow spiders found in supermarket table grapes in New Zealand and Massachusetts have prompted a Fresno State researcher to take another look at vineyard control measures for the ominous pest.

Black widows pose no threat to grape production; their typical diet is insects, not leaves or fruit. However, when products such as table grapes reach a store shelf with a black widow hiding in the cluster, alarm bells go off everywhere, noted plant science professor Andrew Lawson in explaining recent studies on methods to control black widows in table grape vines.

"The movement of any black widow from the vineyard to the market place presents an immediate concern to the table grape industry," Lawson stated.

In 2001, for example, New Zealand banned imports of California table grapes after four black widows were found in grape bunches. In the eastern U.S., three black widow findings in California table grape bunches were reported from Shaw's supermarkets in the Boston area. Such discoveries can cause consumers to scatter and product demand to evaporate.

Researchers suspected that new,



Left: Technician applies insecticide during trials testing control measures.

Below: Black widow spider with egg sac found near base of vine in San Joaquin Valley table grape vineyard.



less toxic formulas of insecticides, used to control common vineyard pests such as mites, leafhoppers and mealybugs, can leave black widows unscathed. Lawson's work appears to confirm that.

His project began with three objectives: 1) to test the efficacy of chemical control products in the field and laboratory, 2) to document population densities and specific vine locations of black widows in San Joaquin Valley vineyards, and 3) to examine black widow spiderling mortality, dispersion and development throughout the growing season.

Of seven currently-used pesticides tested, only three – Lannate (methomyl), Lorsban (chlorpyrifos) and Danitol (fenprothrin) – provided 100-percent control of adult male and female black widows by direct exposure, Lawson reported. Lorsban also provided control of adult females when the spiders were exposed to treated vine bark.

Field studies revealed that adult spiders were present throughout the year but were most abundant in the late summer and fall, when mature females comprised more than 90 percent of spiders found. Adult females produced egg sacs from April through September.

Site preference surveys revealed preferred locations.

"In general, black widow

spiders and their webs are most commonly found on the vine trunk, especially near the base and cordon," Lawson said. "Spiders nest in protected areas such as the space between the trunk and vine stake or trellis system, or crevices in the cordon."

Spiders are rarely found in grape clusters or on grape leaves, he added.

A key cooperator in the study was Kent Daane, a biological pest control specialist for the University of California Cooperative Extension (UCCE), based in Parlier, California. Daane will serve a major role in making control recommendations based on the study.

Monitoring recommendations include the following: Approximately 1,000 vines per vineyard block should be examined for black widow webs by walking 5 to 10 rows.

"Before any treatments, we recommend destroying nests," Lawson stated. "If treatment is effective, nests should not be rebuilt following treatment."

This research was sponsored by the California State University Agricultural Research Initiative (ARI) and the California Table Grape Commission.

For more treatment information, contact Lawson at alawson@csufresno.edu or Daane at daane@uckac.edu.



Black widow web found between stake and base of vine reveals common choice for nesting.

Center for Agricultural Business

New CAB report outlines issues of food traceability

Highly-publicized incidents of food-borne illness in the United States in recent years have revealed that in spite of established industry practices for safely packaging food, failures do occur, and food products sometimes become contaminated.

In 2006 for example, three people died, more than 100 were hospitalized, and 200 more estimated sickened in just one case of contaminated food, which turned out to be packaged spinach tainted with *E. coli* bacteria. After extensive investigation, researchers traced the spinach, which had been sold all over the country, to production areas in the central coast region of California.

The U.S. Centers for Disease Control and Prevention estimates that food borne diseases cause approximately 76 million illnesses, 325,000 hospitalizations, and 5,000 deaths in the United States each year. For this reason and others, there is a clear need to improve methods for tracking production and processing of food products. The subject is addressed extensively in a new report on "traceability" published by the Center for Agricultural Business.

According to Mechel Paggi, CAB director and one of the publication's authors, traceability is "the accurate generation and recording of a product's history, including all processes that

transport or transform it."

This involves tracking not only routine movement like packing, but mixing of lots, re-palletizing of cases, and even combining products in food preparation, Paggi noted.

"Traceability systems must be able to provide a clear record of an agricultural product, not only during production and packing, but in distribution as well," he said.

The title of the new report is "Traceability for Food Marketing and Safety." Its purpose is to provide an overview of the current state of traceability systems in the specialty crop industry and to document to the extent possible the cost and potential benefits to California producers from adoption of these systems.

Unfortunately for some in the food production industry, a key purpose for a traceability system is to provide information needed to assess liability in cases of contaminated products. Actually, sources referenced in the report indicate that the number of liability claims that go to court over food borne illness is very small compared to the overall number of cases. However, publicity and lawsuits over individual cases can severely damage an industry and devastate a single company

Impact of the E.Coli Spinach Incident on Weekly Supermarket Sales of Spinach, in \$1,000, 1/9/05 through 5/27/07

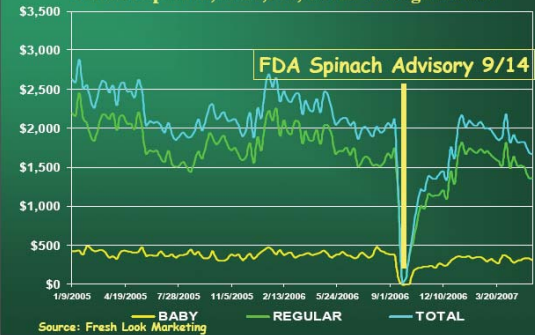


Chart above shows impact of a United States Food and Drug Administration Advisory warning consumers of possibly tainted spinach. Sales plummeted the week of the advisory and took more than four months to recover.

that is found to have made a mistake.

With that reality acknowledged, the benefits of traceability in food production systems are many and will help the industry in general, even though it raises the price of product, Paggi noted. One benefit is improved ability to identify and recall a product when a food safety problem is discovered. This not only helps to correct problems; it helps to protect and maintain the integrity of the industry as a whole when it can identify and correct problem areas.

Other benefits include the ability to guarantee product origin when that information is important to the consumer; improvement in overall supply management; and ability to differentiate between domestically and foreign supplied products.

Since traceability is a still-growing industry in its own right, work needs to be done in applying it to the various facets of the food production, processing and distribution, Paggi said. The new report is aimed primarily at economists and consultants who work in developing and testing systems. It includes several sections, including one of theoretical underpinnings and another featuring the "California Experience."

For information on obtaining a copy of the publication, contact CAB at 559-278-4405 or visit the CAB website at <http://cati.csufresno.edu/cab>.

Upcoming events

Aug. 21 – Farm Labor Contractor Education Institute at the DoubleTree Hotel in Bakersfield. Presented in English and Spanish. For details, call 559-278-4677.

Sept. 25 – Farm Labor Contractor Education Institute at the Embassy Suites Hotel & Conference Center in Seaside, California. In English and Spanish. For details, call 559-278-4677.

Oct. 29 – Farm Labor Contractor Education Institute at the Piccadilly Inn Airport in Fresno. In English and Spanish. For details, call 559-278-4677.

Nov. 18 – 27th Annual Agribusiness Management Conference and the 2008 Agriculturalist of the Year & Ag Business Award Luncheon at the Fresno Convention Center. For details, call 559-278-4405.

Center for Irrigation Technology

Zoldoske appointed to new CSU water post

Center for Irrigation Technology (CIT) Director David Zoldoske has been tapped by California State University Chancellor Charles Reed to serve in a new position as top water policy advisor for the CSU system.

Zoldoske's appointment comes slightly more than a year after leading members of the CSU and the state's agricultural industry determined that the university system has a significant role to play in helping California address an ever worsening water situation. Increases in residential population, combined with successive dry rainfall years, have left the state with simply not enough water for urban, agricultural and environmental needs.

According to Reed, the CSU's Agricultural Advisory Committee encouraged the CSU to designate an individual who could provide independent and well-informed applied research



CIT director will advise state water issues leaders on initiatives developed through university system

and policy analysis on water-related issues for various agencies and stakeholder groups in California. Zoldoske was chosen from a pool of candidates representing all of the CSU campuses.

"Everyone knows we have a serious water problem, and it needs statewide attention" Zoldoske said in discussing his new role. "As a state, we have to determine what are our water priorities, and what actions need to be taken."

According to Zoldoske, the key to addressing California's water issues is a proper understanding of the state's

major thoroughfare for water use and distribution – the Sacramento/San Joaquin Delta.

"The delta supplies water to 22 million people in our state, and it is facing environmental challenges, including multiple listings of endangered species," Zoldoske said. "It is imperative that we maintain the health of the delta so that it can still be used to meet our water needs."

Various entities have control and/or influence over delta water distribution, Zoldoske noted. They include federal and state agencies, cities and water districts, and courts. Last fall a federal court ordered new water release reductions to prevent further erosion of the delta ecosystem. That reduction will provide Central Valley irrigators with only 35 percent of normal 2008 allocations, according to the state Department of Water Resources.

"This has caused significant stress on our existing water budget. But it's something we can't turn away from – protecting the health of the delta should be a priority," Zoldoske said.

Another major issue is groundwater overdraft. Some officials estimate that agricultural and urban users are pumping 1.2 million acre-feet more per year than is being replenished to our underground aquifers in California.

"This is especially pronounced in the San Joaquin Valley. It's like we're

See Water, Page 8



Above: David Zoldoske.

Right: Central California relief map shows San Francisco Bay and the Sacramento/San Joaquin Delta in red.

Abstracts sought for irrigation presentations

The Irrigation Association and the Center for Irrigation Technology (CIT) are sponsoring irrigation-related seminars during the next World Ag Expo, slated for February 10-12, 2009 in Tulare, California.

Presentations should be noncommercial technical irrigation presentations oriented toward growers attending the expo. Presenters chosen through peer review will be asked to make a 20-minute presentation and participate in a

five-minute question-answer period.

Irrigation Association members are encouraged to submit an abstract to be considered for a presentation that will help Expo attendees irrigate more effectively and efficiently.

Deadline to submit abstract is September 5, 2008.

For information on how to submit an abstract, visit the website of the International Center for Water Technology (ICWT) at <http://www.icwt.net>.

Upcoming events

July 24 – Agricultural Pumping Efficiency Program Municipal Pump and Well Efficiency workshop from 8:30 a.m. to 12:30 p.m. at the Southern California AgTAC in Tulare. Call 800-772-4822 for details.

Viticulture and Enology Research Center

Students: Field, lab work builds understanding of process

from Page 1

or highly-specialized equipment assays.

In spite of the routine, a certain drama emerges as Mallea describes the different processes involved in the scientific method, and the potential for discovery and breakthrough. Students often propose new ideas that could help improve methods. In some cases they even conduct secondary research that provides additional data relevant to the main project.

As a graduate student in viticulture and enology, Mallea is conducting his own thesis research project, studying phenolics and tannin development in grapes grown in the San Joaquin Valley.

As part of that project, he and two student colleagues recently spent several hours in a vineyard on Fresno State's university farm, cutting 3,300 individual green grape berries off experimental Syrah vines.

Later in the laboratory, they categorized and labeled the berries according to vineyard row and vine number. Then



Above: After counting, student research assistant Scott Christiansen prepares to dissect individual grape berries in order to extract seeds for study.



Left: Two or three seeds are obtained from each berry.

they began slicing open each of the 3,300 berries and pulling out two or three seeds and placing them in solution. The seeds will later be examined for the level of tannins and other compounds.

When discussing his own project, Mallea is enthusiastic about its potential to help the grape and wine industry.

"This is going to provide an important record. If we know how tannin develops in a hot climate, it will help growers. And it will help them make better wine," he said. "The best research that's going on is all about the interface – the effects of all management techniques working together. That's the coolest research."

Mallea plans to complete his thesis and earn his M.S. in viticulture and enology in the spring of 2009. He said he would some day like to operate a small winery, overseeing both the viticulture and winemaking. His summer work should help him to reach that goal.

Treatments aim to enrich color of wine grapes

Research on the use of abscisic acid (ABA) to enhance color in red wine grapes holds strong potential for improving wine grape quality for growers in central California.

According to project director Sanliang Gu, a viticultural research specialist for Fresno State's Viticulture and Enology Research Center (VERC), some 60 percent of the wine grapes produced by California's world-renowned wine industry are grown in warmer regions of the state, such as the San Joaquin Valley. That high production figure, however, brings in only about 25 percent of the state's total receipts for wine grapes.

"Temperatures in these regions often exceed the optimum for fruit color development during the ripening period," Gu said. Because of the generally lower quality of wine grapes from these regions, prices paid to growers are among the lowest in the state.

Gu led small-scale preliminary studies on ABA use in 2005 and 2006. The results were encouraging, suggesting that ABA has a positive effect on color development.

The current project is being conducted over three growing seasons, focusing on color development and extractability by applying ABA around veraison. Grape varieties assessed include Cabernet Sauvignon, Syrah, Merlot, and Zinfandel.

Fruit is being sampled bi-weekly from the time of application until harvest for color content and extractability. Other vine responses

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Upcoming events

Aug. 12 – Fresno State Grape Day, field day and open house for grape growers and winemakers, from 7:30 a.m. to noon at Fresno State. Includes presentations and tours at the viticulture and enology facilities. For details, call 559-278-2089.

Aug. 12 – Berry Evaluation Workshop for grape growers at Fresno State. For details, call 559-278-2089.

Aug. 28 – Welcome-back Barbecue hosted by the Fresno State Department of Viticulture and Enology. Call 559-278-2089.

JULY 2008



CIMIS

California
Irrigation
Management
Information
System

Using CIMIS to mitigate drought effects

California had two consecutive dry years which resulted in low levels of reservoirs and the driest spring on record for Northern California. These, combined with the court-ordered water transfer restrictions, have reduced water deliveries from the delta to one-third of allocation. Governor Arnold Schwarzenegger declared a statewide drought on June 4, 2008 and urged all Californians to conserve water. Earlier in the year, the Governor presented a comprehensive water package that calls for a 20-percent reduction in per capita water use in urban areas by 2020. Different agencies, including the Department of Water Resources, are working on strategies to meet this target. CIMIS is one of the key state programs that was mentioned in these endeavors.

Urban landscape irrigation is one of the areas where a great deal of water

Visit the CIMIS home page at
<http://www.cimis.water.ca.gov>

savings can be realized. Although there are many different ways to save water in landscape irrigation, applying the right amount of water at the right time plays a major role. CIMIS is a tool that is available to Californians for determining when to irrigate and how much water to apply so that a pleasant landscape can be maintained without wasting water and polluting the environment. For details on how to use CIMIS information for irrigation scheduling, please visit <http://www.cimis.water.ca.gov/cimis/infoIrrSchedule.jsp>.

CIMIS currently has more than 130 active weather stations scattered throughout California. Given the large size of the state and its diverse weather patterns, however, more stations are

needed to represent different regions of the state than CIMIS currently has. To mitigate the problem of spatial data gaps, CIMIS has been developing a system that produces daily maps of ETo by coupling remotely sensed satellite data with point measurements at the stations. This system has now been beta tested and will be released to the public this summer.

Another resource that CIMIS, in cooperation with local water agencies, has been developing is a web service system that provides data to ET Controllers in different formats. ET Controllers are devices that turn sprinklers on and off depending on information that they automatically receive from weather stations such as CIMIS. The upgraded and expanded CIMIS system will surely assist California's irrigators conserve the much needed water and achieve the Governor's water savings plan.

For more CIMIS information...

CIMIS information is published quarterly in the CATI *Update* newsletter. Articles are provided by the California Department of Water Resources, CIMIS program staff.

For more information about CIMIS or its programs, contact any of the following representatives at these offices:

Northern District
Mark D. Rivera
(530) 529-7301
mriviera@water.ca.gov

Central District
Kim Rosmaier
(916) 651-0737
krosmaie@water.ca.gov

San Joaquin District
Steve Ewert
(559) 230-3334
sewert@water.ca.gov

Southern District
Sergio Fierro
(818) 543-4652
sergiof@water.ca.gov

Weekly ETo Comparisons for Fresno

CIMIS Station #80 at Fresno State 3/01/08 – 05/31/08

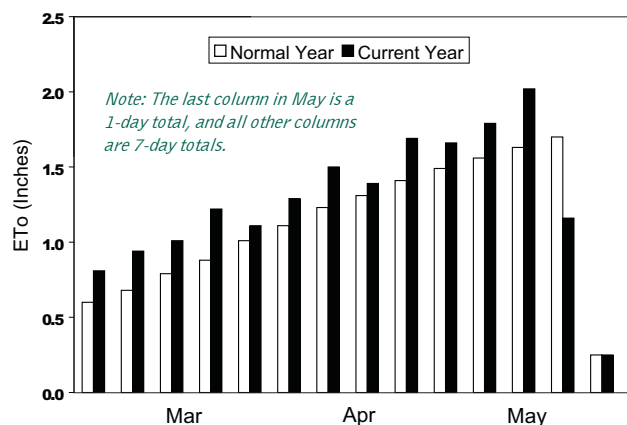


Chart shows ETo variation from normal over last three months.

ARI service recognized

Founding board members helped to guide research program to international status

Founding members of the governing board of the California State University Agricultural Research

Initiative (ARI) have been honored for helping to guide the program from its debut in 1999 to state, national, and international prominence during the 2000s.

At the board's annual spring meeting in April, chair Pat Ricchuiti, President of P-R Farms in Fresno, expressed appreciation to four members who were appointed to the original board in 1999 and have concluded terms of varying lengths.

The board of governors is the policy and funding authority for the ARI program. The board consists of the presidents of the four ARI member campuses; the University of California Vice President for the Division of Agriculture and Natural Resources; and four representatives of California's agricultural industry.

The four ARI member campuses are

California State University, Fresno; California Polytechnic State University, San Luis Obispo; California State Polytechnic University, Pomona; and California State University, Chico.

Also honored at the meeting were the four original members of the ARI Deans' Council, who also have completed terms of service. The deans' council, comprised of the deans of agriculture of the ARI member campuses, advises the board of governors and the executive director with strategic planning and research/academic program curriculum integration issues.

The California Agricultural Tech-



ARI board chair Pat Ricchuiti (right), president of P-R Farms in Fresno, presents ARI award of appreciation to board member W.R. Reg Gomes during the board's annual spring meeting.

nology Institute (CATI), located at California State University, Fresno, oversees ARI industry/governmental liaison, funding, and administrative operations. CATI Director of Operations Joe A. Bezerra is the ARI executive director.

ARI Board members recognized, along with ARI terms of service

W.R. Reg Gomes – University of California: 1999 to 2007

Bob H. Suzuki – California State Polytechnic University, Pomona: 1999 to 2003

Jeffery Poston – JAUQUES Dairy: 1999 to 2007

Manuel A. Esteban – California State University, Chico: 1999 to 2003

Deans' Council members recognized, with ARI terms of service

Daniel P. Bartell – California State University, Fresno: 1999 to 2006

Joseph Jen – California Polytechnic State University, San Luis Obispo: 1999 to 2001

A. Charles Crabb – California State University, Chico: 1999 to 2006

Wayne R. Bidlack – California State Polytechnic University, Pomona: 1999 to 2007

Grapes: Color increase would boost returns

From Page 5

also will be monitored during both growing and dormant seasons, including yield and berry components, pruning weight, vine vigor, return bloom and fruit set.

Small lots of wine will be made and analyzed for color and chemistry.

"It is difficult to estimate the dollar value of the proposed project without knowing the actual impact," Gu said.

"However, an increase in color by 25 to 50 percent for red wine grapes will be a remarkable improvement for the warmer regions of wine grape production in California."

ARI/CATI on the Web!

The California State University Agricultural Research Initiative (ARI) oversees applied agricultural, agribusiness and natural resources research on behalf of California agriculture. For information on our research and project results, visit our website at <http://ari.calstate.edu>.

The California Agricultural Technology Institute (CATI) administers ARI funding and oversees additional applied agricultural research. For more information about CATI and its research centers, visit us at <http://cati.csufresno.edu>, or at our centers:

Center for Agricultural Business (CAB) – cati.csufresno.edu/cab

Center for Food Science and Nutrition Research (CFSNR) – cati.csufresno.edu/cfsnr

Center for Irrigation Technology (CIT) – cati.csufresno.edu/cit

Viticulture and Enology Research Center (VERC) – cati.csufresno.edu/verc

Agricultural Technology Information Network (ATI-Net) – cati.csufresno.edu/atinet

Water: Sustainable water practices to receive top priority

from Page 4

extracting an amount the size of Pine Flat Lake from the ground every year, and not putting it back. And the remaining water is deeper and more expensive to pump,” Zoldoske said.

One of his key responsibilities in his new position will be advising university leaders, the agricultural industry, and other state leaders on water policy issues and initiatives developed through the CSU. As leader of a system-wide effort, Zoldoske will help to coordinate research, service and curricula addressing water issues and will oversee efforts to generate external support for research, education and service activities.

“We have to develop sustainable water-use practices in California. And these practices must be based on good science. Part of my job will be to inventory current research being conducted within the CSU system, to look for cooperators, to get people together,” Zoldoske said. “We need to organize all players and seek solutions together as we face these multiple issues.”

Leaders of water-related research and policy may contact Zoldoske for more information or discussion via email at davidzo@csufresno.edu.

Olive oil by-product eyed as feed supplement for swine

A research study in one of California’s major olive-growing regions has indicated that a by-product of olive oil production could benefit swine producers and also pork consumers.

The study of olive pomace as an additive to swine feed was conducted by S. Patrick Doyle, assistant professor of animal science at Chico State, located in north central California, where much of the state’s olive crop is grown.

Because of the relatively large extent of production, opportunity exists for olive oil producers to capture market share in by-product feeds in California, Doyle noted as a reason for the study.

Olive waste appears to be a good source of fat and also contributes crude protein to an animal diet, he said.

In the main part of the study, 60 pigs were assigned to two treatment groups: one group was fed a corn-based control regimen, with the other fed olive pomace at a 10-percent inclusion rate. Pigs were maintained in a concrete finishing facility at the university’s Agricultural Teaching and Research Center.

There appeared to be no significant

differences in average daily gain or carcass yield between the two diet treatments, Doyle reported.

Carcass analysis after normal processing also revealed reduced percentage of saturated fatty acids and omega-6 fatty acids, as well as lower levels of polyunsaturated fatty acids.

“Results suggest that feeding olive pomace in a finishing diet has the potential to change the fatty acid profile of pork, providing a healthier meat product,” Doyle stated among his conclusions.

The work was funded in part by the California State University Agricultural Research Initiative (ARI), based at the California Agricultural Technology Institute at Fresno State. Support also was provided by the Sierra Olive Oil Group, the USDA, and High Sierra Beef.

For project details, contact Doyle at Chico State at 530-898-6586 or via email at pdoyle@csuchico.edu.

In the event of incorrect address information or extra copies to your workplace, please return this address label by mail or fax with your requested changes. CATI fax number is (559) 278-4849.

Update

Update is published quarterly by the California Agricultural Technology Institute

College of Agricultural Sciences and Technology

California State University, Fresno
Summer 2008

CATI Publication #080701

Voice number: (559) 278-2361

Fax number: (559) 278-4849

Director of Operations: Joe Bezerra
Publications Editor: Steve Olson

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