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*From the Director*

## **Portland Conference Success Shows Impact of Sustainable Ag**

Farmers and ranchers shared the podium with scientists, elected officials, nationally known speakers and non-profit representatives in March at the highly successful sustainable agriculture conference *Farming and Ranching for Profit, Stewardship and Community* in Portland, Oregon. As co-chair of the event, which was sponsored by the USDA Western Sustainable Agriculture Research and Education Program (Western SARE), I would like to briefly share with you the results of this inspiring conference.

We had planned for attendance of 500, but more than 600 registrants arrived from 36 states and Pacific Island Protectorates, and 175 people attended three simultaneously run field tours of farms and community operations near Portland after the main conference. Farmers and ranchers comprised nearly 30 percent of conference participants. Many of the 100 presentations and panel discussions were “standing room only,” which generated great excitement and networking among those attending. The press coverage was thorough by both general and agricultural news media, including an Oregon Public Radio on-farm interview with **Larry Thompson**, an Oregon farmer and chair of the Western SARE Administrative Council. In the extended interview Thompson clearly defined his stewardship and community-oriented philosophy.

Most importantly, as a real “on-the-ground indicator” of potential impact, on their conference evaluation survey forms nearly every farmer and rancher said they would be changing their farming and ranching practices within six to 18 months as a result of what they learned at the conference. And, of the farm advisors and consultants who answered the survey, ALL reported that they planned to recommend what they learned at the conference to their clientele. Nearly 90 percent of participants reported enhanced knowledge of sustainable agriculture as a result of conference attendance. Seeing national and state government leaders like U.S. Deputy Secretary of Agriculture **Richard Rominger** share the opening platform with Governor of Oregon **John Kitzhaber** and hearing scientists and producers focus on sustainable agriculture solutions confirms what I have observed after 20 years of participation in sustainable agriculture research and extension: This knowledge and practice is increasingly mainstream, and our effort is vital now to help guide policy and ensure sustainability for future generations.

The success of this regional conference was a multistate effort. I worked with co-chairs **John Luna** from Oregon State University and **David Granatstein** at the Center for Sustaining Agriculture and Natural Resources at Washington State University, and the staff at Western SARE, including **Kristen Kelleher**, housed here at the UC SAREP main office in Davis. Several SAREP staff members participated in the event, including our Associate Director **Jenny Broome**, **David Chaney**, SAREP’s education coordinator, and **Gail Feenstra**,

our community food systems analyst. To commemorate the event, we produced a unique proceedings, *Sustainable Agriculture ... Continuing to Grow*, which combines profiles of farmers, ranchers, marketers, and advocates who spoke at the conference, with scientific abstracts from researchers who were also present. The breadth of vision and unity of purpose in this proceedings is remarkable and serves as a testament to the vitality of sustainable agriculture as a method and movement in the West. The demand was high and we've already distributed all copies of the document, but it will be on the Western SARE Web site by the end of the summer at <http://wsare.usu.edu/>

Being part of this ambitious effort was exciting and invigorating. It is a real pleasure to report that such success and impact in the field was generated from this collaborative project.—*Sean L. Swezey, director, University of California Sustainable Agriculture Research and Education Program.*

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# SAREP Funds New Graduate Research Projects, Educational Events

By Bev Ransom, SAREP

Seven graduate students and 26 educational events have been granted a total of \$37,240 in the ninth funding cycle of SAREP's Sustainable Agriculture Graduate Awards (SAGA) and Educational Events grants programs. The SAGA grants program, which was initiated in 1992, encourages new researchers to explore areas that address the goals of sustainable agriculture. This year brought a record number of proposals from six California universities.



Children participate in garden workshop at UC Davis.  
(photo by Carol Hillhouse)

“This was really an inspiring group of proposals,” says **Mark Lipson**, one of the SAREP Program Advisory Committee (PAC) members who reviewed the proposals. “Lots of upcoming talent! What a great investment.”

Funding recommendations were made by a sub-committee of two PAC and three Technical Advisory Committee (TAC) members.

The Educational Events grants program, which also began in 1992, continues to reach hundreds of participants throughout the state with events that provide practical information on a broad range of topics supporting sustainable agriculture. Event coordinators are funded to conduct workshops, field days, or other instructional events.

Titles of the funded graduate student projects and educational events, award amounts, and contact information are listed below.

## Graduate Student Awards (7 projects; \$18,540)

- **Emily Blanco**, “Investigation of Nest Trapping as a Means of Suppression of Argentine Ant (*Linepithema humile*) Populations,” \$3,000. Department of Entomology, UC Davis. (530) 752-9977, [etblanco@ucdavis.edu](mailto:etblanco@ucdavis.edu)
- **Peichen Chen**, “Analysis of Virulence in Root-Knot Nematode (*Meloidogyne hapla*) that Impacts Durability of Host Plant Resistance,” \$2,890. Department of Nematology, UC Riverside. (909) 787-4436, [peichen@ucr.ucr.edu](mailto:peichen@ucr.ucr.edu)
- **Yolanda Chen**, “Evaluating the Efficacy of a Native Parasitoid on its Lepidopteran Host on Wild and Domesticated Sunflower, *Helianthus annuus*,” \$2,650. Division of Insect Biology, UC Berkeley. (510) 642-3989, [yoche@nature.berkeley.edu](mailto:yoche@nature.berkeley.edu)

- **Eileen Cullen**, “IPM Decision Support to Reduce Reliance on Organophosphates for Stink Bug Control in Processing Tomatoes,” \$3,000. Department of Entomology, UC Davis. (530) 752-4785, [emcullen@ucdavis.edu](mailto:emcullen@ucdavis.edu)
- **Nicholaus Madden**, “Conservation Tillage and Cover Crop Systems for Organic Processing Tomatoes,” \$2,000. International Agricultural Development Graduate Group, UC Davis. (530) 754-8993, [nmmadden@ucdavis.edu](mailto:nmmadden@ucdavis.edu)
- **Theresa Ward**, “Riparian Grazing Project: Identifying Riparian Grazing Management that Works,” \$3,000. Department of Agronomy and Range Science, UC Davis. (530) 754-8988, [taward@ucdavis.edu](mailto:taward@ucdavis.edu)
- **Keith Warner**, “From the Outside Looking In: Perspectives on California Sustainable Agriculture Movement from Key Policy Makers and Opinion Leaders in the State,” \$2,000. Department of Environmental Studies, UC Santa Cruz. (831) 635-7302, [keithdw@cats.ucsc.edu](mailto:keithdw@cats.ucsc.edu)

## Grants for Educational Events [16 grants (26 events); \$18,700]

For more information about a particular event use the telephone number or email address listed below. To learn more about SAREP’s educational grants program, call **David Chaney** at (530) 754-8551, [dechaney@ucdavis.edu](mailto:dechaney@ucdavis.edu)

- **John Anderson**, California Native Grass Association. \$1,200. “Techniques and Strategies for Using Native Grasses and Graminoids in Restoration Projects: A Practical Training Workshop.” Dates: 2-day workshop to be held in September 2000. Location: San Diego. (530) 759-8458, [hedgefarm@aol.com](mailto:hedgefarm@aol.com)
- **Janet Brown**, Marin Food Policy Council. \$1,200. “Marin Food Policy Council Facilitated Process for Revision of the Marin Countywide Plan.” Date: 1-day workshop to be held on a Friday or Saturday in July 2000 TBA. Location: San Dominico School Conference Center, San Anselmo. (415) 488-9464, [janet@ecoliteracy.org](mailto:janet@ecoliteracy.org)
- **Ken Churches**, UC Cooperative Extension, Calaveras County. \$700. “Calaveras GROWN Farm Conference.” Date: 1-day workshop to be held on February 17, 2001. Location: Calaveras High School, San Andreas. (209) 754-6477, [cecalaveras@ucdavis.edu](mailto:cecalaveras@ucdavis.edu)
- **Bill Frost**, UC Cooperative Extension, Amador County. \$600. “Noxious Weed Management in Amador County,” Date: 1-day workshop to be held in January 2001. Location: Amador County Fairgrounds, Plymouth. (530) 621-5509, [wefrost@ucdavis.edu](mailto:wefrost@ucdavis.edu)
- **Elaine Hiel**, San Diego Hunger Coalition. \$2,400. “Sustainable Home and Community Gardens.” Dates: 1-day field trip to be held in September 2000 and workshop series (6 days) to begin in September or October 2000. Location: Chula Vista. (619) 692-8390, [ehiel@aol.com](mailto:ehiel@aol.com)
- **Carol Hillhouse**, Department of Pomology, UC Davis. \$1,000. “Capital Region School Gardens Share Day.” Date: 1-day workshop to be held on October 28, 2000. Location: Sacramento County. (530) 752-7655, [jchillhouse@ucdavis.edu](mailto:jchillhouse@ucdavis.edu)
- **Stephanie Larson**, UC Cooperative Extension, Sonoma and Marin Counties. \$600. “Maintaining Sustainable Coastal Beef Cattle Operations by Developing Local, Innovative Marketing Programs.”

- Date: 1-day workshop to be held late Winter 2000 or early 2001.  
Location: Petaluma. (707) 565-2621, [slarson@ucdavis.edu](mailto:slarson@ucdavis.edu)
- **Diane Metz**, UC Cooperative Extension, Solano County. \$1,200. “Fairfield-Suisun Food Security Harvest Faire.” Date: 1-day workshop to be held on September 16, 2000. Location: St. Mark’s Lutheran Church, Fairfield. (707) 421-6792, [dmetz@ucdavis.edu](mailto:dmetz@ucdavis.edu)
  - **Jeff Mitchell**, Department of Vegetable Crops and Weed Science, UC Davis. \$1,200. “Conservation Tillage Equipment Demonstrations: Innovative Strategies for Reducing Tillage in California’s Central Valley Row Crop Production Systems.” Dates: Two 1-day conferences to be held in May 2001. Locations: UC West Side Research and Extension Center, Five Points and UC Davis campus. (559) 646-6593, [mitchell@uckac.edu](mailto:mitchell@uckac.edu)
  - **Richard Molinar**, UC Cooperative Extension, Fresno County. \$1,200. “IPM, Fertilizantes, y Cosechas para El Agricultor en el Valle.” Date: 1-day workshop to be held on December 12, 2000. Location: Andersen’s Pea Soup, Selma. (559) 456-7555, [rhmolinar@ucdavis.edu](mailto:rhmolinar@ucdavis.edu)
  - **Kris O’Connor**, Central Coast Vineyard Team. \$1,200. “Exploring Environmental Labeling and Certification Programs for Sustainable Agriculture.” Date: 1-day workshop to be held in Winter 2000. Location: Paso Robles. (805) 462-9431, [info@vineyardteam.org](mailto:info@vineyardteam.org)
  - **Kosal Ou**, Central California Forum on Refugee Affairs. \$1,200. “Community Gardens for Self-Sufficiency and Food Security: Sharing Best Practices and Models.” Dates: Six 1-day workshops to be held from September 2000 through May 2001. Locations: Fresno and Clovis. (559) 681-6603, [soulhikr@aol.com](mailto:soulhikr@aol.com)
  - **Steve Schwartz**, California FarmLink. \$1,200. “Business Planning and Innovative Financing Strategies to Promote Intergenerational Farm Transitions.” Date: Seminar to be held in Winter 2001. Location: Northern California. (916) 443-4225, [farmlink@tomatoweb.com](mailto:farmlink@tomatoweb.com)
  - **Cathrine Sneed**, The Garden Project. \$600. “Open Garden 2000.” Date: 1-day workshop to be held in July 2000. Location: Bay View Hunter’s Point area, San Francisco. (415) 243-8558, [cathrinesneed@yahoo.com](mailto:cathrinesneed@yahoo.com)
  - **Steve Temple**, Department of Agronomy and Range Science, UC Davis. \$1,200. “Farming Systems Alternatives: Highlights of SAFS 12 Years.” Date: 1-day workshop to be held July 7, 2000. Location: Agronomy Field Headquarters, UC Davis. (530) 752-8216, [srtemple@ucdavis.edu](mailto:srtemple@ucdavis.edu)
  - **Sujaya Udayagiri**, UC Cooperative Extension, Santa Cruz County. \$2,000. “Insect, Disease and Weed Monitoring and Identification Workshops for Limited-Resource Strawberry Growers on the Central Coast - 3 separate events.” Date: 1-day workshop to be held on March 23, 2001. Location: UC Cooperative Extension Auditorium in Salinas/Watsonville. (831) 763-8040, [sujaya@ucdavis.edu](mailto:sujaya@ucdavis.edu)

***Project Update:***

## **SAREP Strawberry Projects: Working on Alternatives to Methyl Bromide**

*By Lyra Halprin and Jenny Broome, SAREP*

Strawberries, one of California's highest value crops, are the focus of four major projects funded by the University of California Sustainable Agriculture Research and Education Program (SAREP).

All four projects are funded with a special allocation from the state legislature in 1998 linked to a bill (AB 1998) promoting the development of alternatives to methyl bromide, sponsored by Assemblymember **Helen Thomson** (D-Yolo County) and administered through the Department of Pesticide Regulation. One of the four projects also receives funding from the Biologically Integrated Farming Systems (BIFS) ag chemical use/risk reduction program. The BIFS program was the original funding target of Thomson's bill.

More than one billion pounds of strawberries are grown in California each year, with more than 26,000 acres harvested throughout the state, valued at nearly \$300 million annually. Planted acreage has doubled on the Central Coast in the last 15 years and now totals more than 11,000 acres. As a high-value, highly competitive specialty crop with exacting cosmetic standards, strawberries are one of the most input-intensive crops in California.

"A number of key chemical inputs used in conventional strawberry production in California are scheduled to be phased out due to environmental or health concerns, and many are losing their effectiveness due to increasing resistance and cost," says **Sean L. Swezey**, SAREP director. "But the biggest concern for strawberry growers is the regulatory actions related to methyl bromide."

Methyl bromide is often used as a pre-plant fumigant to eliminate nematodes, weeds and pathogens in agricultural systems such as strawberries and orchard crops including almonds, walnuts and stone fruits; it is also commonly used as a postharvest treatment to control insect pests. Methyl bromide is designated a Class I ozone depleter scheduled for a 100 percent use reduction in the U.S. by 2005. More than four million pounds of methyl bromide were applied to strawberries in California in 1998.



In Elizabeth Mitcham's work to find alternatives to methyl bromide for postharvest insect control, strawberry fruit in a jar are exposed to various concentrations of acetaldehyde through an injection port in a rubber stopper. (photo by Don Edwards)

“We’re pleased at the progress of the projects specifically targeting methyl bromide alternatives, and the more general demonstration effort aimed at ag chemical use/risk reduction called Biological Agriculture Systems in Strawberries, or BASIS,” Swezey says.

### **Project Cooperation**

Swezey also notes that there is added impact due to some cooperation among the four SAREP-funded strawberry projects. Some researchers are cooperating on component work in UC test plots and nurseries, while BASIS participants are incorporating recent work into their demonstration plots on farms.

**Dave Riggs**, president of the California Strawberry Commission, is pleased to see the four strawberry projects underway. He has been particularly supportive of the outreach effort that is part of the BASIS project, whose demonstration plots are located in Santa Cruz and Monterey counties.

“We’re particularly gratified by this project of biologically oriented solutions integrated into the matrix of conventional farming,” he says.

### **On-Farm Demonstration Project**

**Carolee Bull**, principal investigator for the BASIS project and a research plant pathologist at the USDA Agricultural Research Service office in Salinas, notes that the project management team now includes herself and two UC scientists, an outreach coordinator, two research managers, three grower members, two pest control advisors and two ex-officio members from the California Strawberry Commission. The project also has added an industry partner, Soil Technology, which is providing materials for some of the below-ground research sites and is working with the team to have the products useful in organic systems registered by Organic Materials Research Institute (OMRI).

“The mycorrhizal inoculant we are using as part of the biological system stimulates plant growth and can control some soilborne diseases, and is now registered thanks to our industry partner,” Bull says.

Bull’s team is demonstrating and studying insect, weed, pathogen, fertility and soils management options in strawberries and evaluating possible new techniques to add to the alternative farming system.

“With this approach we hope to provide growers with biological tools to help them manage their pest problems,” she says. “We’re using mentor growers to showcase farms which employ innovative biointensive management strategies. These farms are demonstrating the BASIS template.”

In the fall of 1998 the BASIS team established three field plots with biologically based systems for control of soil-borne diseases and weeds including soil solarization with tarps and broccoli residues, and five field plots for insect control, including the use of trap crops to concentrate insect pests. So far the biologically based system for the control of weeds provides 50 to 70 percent control compared to 100 percent for methyl bromide and Vapam.

Team members have discussed their work at several field days and have signed on new growers. In addition to developing the BASIS template, Bull

reports that significant progress has been made in developing an organic agriculture template called OASIS (Organic Agriculture Systems in Strawberries) and is enrolling organic strawberry producers. The 1999-2000 field season has seen the number of acres enrolled in BASIS double for conventional production and more than double in organic production.

“Many larger growers are curious about organic production,” Bull says. “We hope the increased number of organic acres now part of our study will help answer some of the questions they have.”

Bull says survey results from the 1997-98 season are serving as the baseline reference point for evaluating the project’s progress and performance. Baseline data will be compared with the pesticide use data gathered from BASIS and OASIS plots this year.

“We’re happy team members are interacting with growers, and now we’re seeing the BASIS program begin to integrate its multiple components,” she says.

## Growers

**Mike Oliver** of Pacific Gold Farms is one of the nine growers involved in the BASIS project. Pacific Gold Farms cultivates between 1000 and 1200 acres of strawberries annually throughout Monterey County; recently 25 acres of the farming operations strawberries were certified organic. Oliver has enrolled two fields totaling eight acres in the BASIS project, one organic and one conventionally managed.



“We’re doing crop rotation, and we’ve got a weather station in the test blocks. We can predict Botrytis outbreaks and lygus hatches from the weather data,”

Oliver says. “Things change daily in farming. The more we can learn from researchers who are enthusiastic about their work, the better.”

Ron Koda (left) of the California Strawberry Board, and BASIS principal investigator Carolee Bull check strawberries in a test field. (photo by Max Stevenson)

The weather station was set up by **Jenny Broome**, plant pathologist and SAREP associate director, who developed a weather-driven infection model to monitor conditions for Botrytis bunch rot, a serious fungal disease in winegrapes; that model is being adapted for use in strawberries. The close monitoring can help growers and their pest control advisors treat the crop with inputs to control Botrytis possibly less frequently and more accurately. The weather station is part of a research effort called PestCast supported by another UC program, the State- wide Integrated Pest Management Project.

BASIS team members are evaluating the effect of soil solarization and the use of ozone on weed and microbial populations (both beneficial and detrimental) on Oliver’s test strawberry plots as part of the soil pathogen component of the project. **Joe Valdez**, the Pacific Gold Farming’s pest control advisor, is closely involved with this part of the project. Valdez is particularly interested

in the use of beneficial bacteria to control soil pathogens.

“These practices are all very new,” Valdez says. “We’re going to lose the use of the fumigant methyl bromide and there’s a lot of experimentation with other chemicals, but I don’t think that will really solve the problem.”

“We know the beneficial bacteria live in the soil and are somewhat effective against pathogens, but we don’t know if they’re economically feasible and practical as fumigation alternatives,” he says. “From my own experience, you can’t discount anything as a possible solution because you don’t know if it will work unless you actually try it. The solutions to the challenges we face are going to be new, innovative and maybe visionary. The BASIS program takes a different approach to developing solutions.”

One of the newer techniques Pacific Gold Farms is using is the establishment of trap crops, one of the above-ground pest control strategies used in the BASIS program.

“I’ve got a load of yarrow plants in my truck for trap crops,” Oliver says. “The yarrow attracts lygus bugs and different species of wasps that go after the lygus.” Lygus bugs are one of the most economically devastating pests in strawberries.

Oliver is practical in his approach to the BASIS program. “The reason we’re doing all this is to remain competitive,” Oliver says. “It’s the way the industry is going. As methyl bromide is phased out, there are lots of things we’re going to have to learn to do, like crop rotation and understanding different soils.”

### **Strawberry Root Health**

UC Davis plant pathologist **John Duniway** is directing a project aimed at finding soil microorganisms to improve root health, growth and yield of strawberry plants without methyl bromide soil fumigation, which can be integrated with other cultural, biological and chemical treatments.

“While no individual microorganism or combination of beneficial microorganisms is likely to reproduce the large yield increase we get with methyl bromide and chloropicrin fumigation of the soil, inoculations with specific microorganisms [to stimulate growth] are likely to increase yield significantly,” Duniway says.

Duniway’s team evaluated four different species of bacteria and several application regimes in inoculation trials at the Monterey Bay Academy site in Watsonville.

“Since we’ve just begun to pick fruit to determine yields in early April, differences among these treatments are still small,” he says. He notes that the bacterial treatments found to increase yields in greenhouse trials so far do not appear to increase yield when used alone in the field, but in combination with a low dose of chloropicrin they increased growth significantly.

Duniway says preliminary results from his tests at the UC South Coast Research and Extension Center in Irvine are similar.

“At Irvine we inoculated with three different bacteria using both plug plants

developed by **Kirk Larson** [a principal investigator on another project mentioned in this article] and bare root transplants,” he says. He notes that growth and yield differences through March were small, and so far only fumigation treatments have increased yield.

“We are continuing to screen additional bacteria for beneficial effects on strawberries in the greenhouse,” he says. “Some of our recent isolates show considerable activity.”

Currently, the most economically feasible alternatives to methyl bromide for strawberry production are other chemical fumigants, Duniway notes, but most are less effective or more variable than methyl bromide and all have risks and some do not have full registration or public acceptance.

“Nonchemical approaches are needed to supplement chemical alternatives or possibly replace them in the longer term when used in integrated systems,” Duniway says. “Introducing beneficial microorganisms with transplants is one such approach that warrants research for strawberries, especially since the method can be combined with current practices and, in the future, with other approaches into less pesticide-intense systems.”

Duniway says that the results obtained so far show some of the potential benefits and pitfalls of using biological agents to help replace methyl bromide. Inoculations with bacteria were beneficial only in combination with a low level of a chemical fumigant, while most of the inoculation treatments alone attempted in the field this first year were not beneficial.

“Clearly, these results are very preliminary and more research needs to be done to know if and when beneficial bacteria might be used to advantage in commercial strawberry production,” he says.

### **Strawberry Transplant Project**

In the 1999-2000 production year, California farmers planted 600 million bare root strawberry transplants. Annual plantings of pathogen- and pest-free transplants have been the basis for high productivity and successful strawberry integrated pest management (IPM) programs for decades. These “clean” bare root transplants are produced in a process that includes at least three field propagation cycles, with preplant soil fumigation used in advance of each cycle. Currently, strawberry nurseries fumigate with mixtures of methyl bromide and chloropicrin to ensure the production of pathogen- and nematode-free transplants.

One of the SAREP-funded methyl bromide alternative projects is determining the potential for using containerized strawberry transplants to produce pathogen- and pest-free planting stock in soil-less media, thus eliminating the need for methyl bromide soil fumigation. This research is evaluating the potential to make a major change in the way strawberry planting material is produced with possible reductions in the use of the ozone-depleting methyl bromide.

**Kirk Larson**, an associate pomologist and associate UC Cooperative Extension specialist at UC Davis, is working at the UC South Coast Research and Extension Center in Irvine and other locations in the state to develop suitable methods for propagating and conditioning strawberry plugs under

California conditions. Larson is also evaluating plug performance in the state's major strawberry production regions. Although strawberry plugs are used in other parts of the U.S., there is little information regarding propagation and use of plugs for strawberry production in California.

Larson and co-investigators conducted strawberry plant propagation research using disease-free, soil-less media in a commercial nursery in Redding during the 1999 propagation season. Despite the preliminary nature of the results obtained so far, it is possible to draw certain conclusions, he says.

“There appear to be clear benefits to yield and fruit quality by growing strawberry plug plants in a high elevation,” he says, “Also, plug plant age appears to have significant effect on fruit production, with the older more mature plugs outperforming younger plug plants.”

Larson says neither result is entirely unexpected, as the benefits of runner plant age and high elevation propagation have been shown before, however, in the conventional bareroot production systems the information is crucial to make this new system work.

Larson confirms what many home gardeners have found to be true: It's not hard to propagate strawberries. Take a cutting from a strawberry plant runner, put it in the ground, and it will tend to grow and produce, he says.

“The key is the quality of the plant and the fruit,” he says. Quality is the critical variable for California strawberry growers as they compete with other California growers and with strawberries produced in Florida and other locations. “It's important because the market is very competitive, except maybe in December when consumers will buy anything red,” Larson adds.

Larson is conducting field trials in test plots in Irvine, where he is testing 17 plug treatments in replicated plots. He is looking at results when plugs are different ages at planting, when different container sizes are used, and when plugs are conditioned at different nursery locations (in MacDoel, or in Redding either on benches in a nursery or stored in coolers at night to try to replicate higher elevation conditions).

He notes that while productivity is important, quality has always been the stumbling block.

“Plug plants can produce large amounts of fruit, but the fruit quality is often inferior-small and misshapen,” he says.

Thus far, his results show that achieving fruit quality from plug plants is going to involve some kind of conditioning for the plugs at high altitudes and latitudes. His trials have taken place at MacDoel, which has an elevation of 4200 feet at the Oregon border, and in coolers in Redding.

He says the shorter days and cooler nights beginning in late summer in high elevation nurseries somehow lead to strawberry plugs that have higher yields and quality. Larson tried to duplicate these natural conditions in Redding by putting the transplants into coolers at 4 p.m. daily beginning in early September.

“We were hoping that our coolers would duplicate the outcome,” he says, “but

we weren't very successful in mimicking the total high elevation environment.”

Larson says he is targeting two main variables in this research: 1) the location (elevation, temperature, daylight hours) of the nursery, and, 2) the timing/mechanics of the propagation system.

Regarding the mechanics of the propagation system, Larson says the main variable appears to be plug age, with plug container size having less of an effect. He used plug plants that varied from six to 10 weeks in age; older plugs tended to out perform the younger plants.

“We need to produce a more mature plug plant by September, which probably entails starting the mother plants in April rather than May,” he says.

Larson notes that turn-around time and space for plants with long runners is an issue for commercial plant nurseries. “We’re learning a lot about the ins and outs of this system and we’ve made a lot of progress,” he says. “We know it is important for the use of plug plants to remain cost effective, which is part of my task.”

His plans for the next season include cutting the runner tips earlier in the propagation cycle, so they can have a month to six weeks of high elevation conditioning.

## **Postharvest Insect Control**

**Elizabeth Mitcham**, an extension specialist in the UC Davis Department of Pomology, is the principal investigator in a project focusing on the possible use of acetaldehyde and carbon dioxide rather than methyl bromide as fumigants to control insects on harvested strawberries. Developing postharvest alternatives to methyl bromide is critical for California’s growing export market, as the chemical is used for quarantine control of insects on fruit exported to Japan and Australia.

Acetaldehyde is a compound naturally produced and metabolized by the fruit, while carbon dioxide (CO<sub>2</sub>) is formed by the decay of organic material and the respiration of living organisms and is naturally present in the atmosphere.

Previous studies have shown that fumigation with acetaldehyde and CO<sub>2</sub> is promising as an alternative to methyl bromide for postharvest insect and mite control.

“We’re trying to determine the effectiveness of acetaldehyde fumigation alone and in combination with carbon dioxide to kill western flower thrips and two-spotted spider mites,” Mitcham says. “We have preliminary data that looks interesting, but we need more work.”

Mitcham says experiments so far have shown that if the levels of acetaldehyde are too high, in addition to killing insects it can give “off” flavors to the strawberries. “However, the right amount of acetaldehyde enhances the aroma of the fruit,” she says. “It increases the amount of volatile compounds, which is where the aroma comes from, and can make a big difference in the aroma.”

Mitcham says that even though acetaldehyde is a natural compound, because it

would be used in higher concentrations than would naturally occur in the fruit, its safety would have to be checked. “It might be a ‘Generally Recognized As a Safe’ [GRAS] compound, but that remains to be determined,” she says.

Tests with thrips and mites exposed to acetaldehyde at the same levels that were not damaging to the fruit look promising for pest control, she says.

“However,” she says, “when we put the fruit and the pests and the same level of acetaldehyde together, the fruit absorbs the acetaldehyde so quickly that there is not enough left for good insect control. Now we’re testing insect mortality with the fruit present to see if there’s a different strategy to use to get insect control without damaging the product.”

“It’s been a fun project and we’re guardedly optimistic,” she says. “We’re not home free, but we still think it has a lot of potential.”

If successful, this treatment could provide consumers with less chemical residues and potentially enhanced flavor and aroma. This approach could also be used for other commodities, Mitcham says.

“We experienced a learning curve in methodology development,” she says. “Our early work with acetaldehyde was much more variable and difficult to interpret. Improvements in methods and techniques have removed most of this variability, and some of the earliest work will be repeated. We’ll also look at the effects of CO<sub>2</sub> with acetaldehyde on both insect mortality and fruit tolerance in more depth.”

## **Practical Help**

**Reggie Knox**, a cooperator on the BASIS project from the Community Alliance with Family Farmers, is pleased to see the four SAREP-funded strawberry projects underway.

“Strawberry growing is very complex and tremendously capital-intensive, costing growers \$25,000 to \$30,000 per acre in labor and inputs,” he says. “So it’s easy to see the challenges in replacing a product like methyl bromide, which has been very effective in getting yields up, or in experimenting with an approach that looks at the entire farming system.”

“When we’re starting to look at a biological system in strawberries there are a tremendous amount of variables, whether it is below-ground doing inoculant trials with mycorrhizal fungi to stimulate growth, or above-ground looking at different trap crop plants to concentrate destructive pests like lygus,” he says. He notes that the partnerships of scientists and growers in the strawberry projects are important in finding solutions for the industry.

**Dave Riggs**, Strawberry Commission president, is glad research priorities are aimed at practical help for growers.

“The strawberry commission has been looking at methyl bromide alternatives for many years,” Riggs says. “Thirty years of work has given us a good understanding of alternatives that exist, but the SAREP grants allow us to go beyond what is currently available to offset the loss of methyl bromide.”

*Additional methyl bromide alternatives projects funded by SAREP, “Cultural Control and Etiology of Replant Disorder of Prunus spp.,” Greg Browne, Russell Bulluck, Tom Trout; “Development of Grape Rootstocks with Multiple Nematode Resistance,” Howard Ferris; and “Alternatives to Methyl Bromide for Control of Soil-borne Fungi, Bacteria and Weeds in Coastal Ornamental Crops,” James MacDonald, Clyde Elmore, Steve Tjosvold, will be described in the next issue of Sustainable Agriculture (Volume 12, No. 3).*

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## Organic Gardening, Farming Apprenticeship at UC Santa Cruz

An “Apprenticeship in Ecological Horticulture,” a six-month training course in organic gardening and farming, is being offered at the Center for Agroecology at UC Santa Cruz. The course emphasizes hand-on learning and class instruction on organic horticultural methods. Cultural requirements for vegetable, herb, flower and fruit cultivars are covered, including soil preparation, composting, sowing, cultivation, propagation, irrigation, and pest and disease control. Marketing efforts include an on-site community supported agriculture (CSA) project. The full-time program includes field and garden work, classes, readings and field trips. The 35 to 40 apprentices each year come from throughout the U.S. and abroad and represent a wide spectrum of ages, backgrounds and interests. Several full and partial tuition waivers are available for minorities and for economically disadvantaged individuals. Tuition for the 2001 program is \$3,000 with additional costs for books, tools and food. Program graduates receive a certificate for 20 units of UC Extension credit. Application deadlines are **November 1, 2000** for U.S. and Canadian citizens, and **September 1, 2000** for international applicants. For more information, contact the program at Apprenticeship Information, Center for Agroecology, 1156 High Street, Santa Cruz, CA 95064; Tel: (831) 459-2321; Fax: (831) 459-2799; Web site: <http://zzyx.ucsc.edu/casfs>; email: [annemari@zzyx.ucsc.edu](mailto:annemari@zzyx.ucsc.edu).

## Kathleen Barsotti

The agriculture community mourns the passing of **Kathleen Barsotti**, 51, who died July 2 after a valiant nine-year battle with breast cancer. Kathleen was a member of SAREP's Program Advisory Committee from 1991-93, and served as a grower cooperator on the Sustainable Agriculture Farming Systems comparison project for many years. The proprietor of Capay Valley Fruits and Vegetables, Kathleen brought innovation to her 70-acre organic farming operation for more than two decades. She received a master's degree in ecology in 1974 from UC Davis and started farming organically with four partners on a small plot of land in the Capay Valley northwest of Davis. A pioneer in organic farming and small-scale marketing, Kathleen sold her organic produce to wholesalers, gourmet restaurants, at farmers' markets and to a network of subscribing consumers. Last year she was honored with the University of California Small Farm Program's 1999 Pioneer Agriculturist Award for her lifelong commitment to organic farming, her dedication to helping other organic farmers and her efforts to establish the Davis Farmers' Market. She is survived by her husband Terry Schroeder, and sons Ché Barnes, Noah Barnes, Thaddeus Barsotti and Freeman Barsotti.

## Donation Honoring Jane Potter Gates

SAREP is pleased to announce the receipt of a donation for its Sustainable Agriculture Graduate Awards in honor of **Jane Potter Gates**. The donation was made by the Council on Botanical and Horticultural Libraries, Inc. (CBHL), which recently honored Gates with its Charles R. Long Distinguished Service Award. Gates has retired after 11 years with the Alternative Farming Systems Information Center (AFSIC) at the National Agricultural Library, the last seven of which she served as coordinator. CBHL is honoring Gate's outstanding contributions to the field of botanical and horticultural libraries and literature, and noted at its awards ceremony that "under her leadership, AFSIC has grown and is one of our most successful information centers."

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*Technical Reviews*

## **Consolidation in the Food and Agriculture System**

*William Heffernan, Mary Hendrickson and Robert Gronski.*

National Farmers Union, Denver, Colorado. 1999

This report outlines the emerging organizational structure of the national and global food system which, according to the authors, is powerful enough to undermine the intent of national agricultural policy developed over the past few decades. Although often referred to as “the industrialization of agriculture,” these changes go far beyond production agriculture to include the entire food system. This report is an attempt to elucidate the magnitude of these changes in the food system and to articulate some of the implications for agriculture and for its long-term sustainability. Although this report drew upon data about major commodity systems in the Midwest, California farmers are not immune from the impacts of concentration in the food system. The fact that a major farmers’ organization requested that the University of Missouri provide data and analysis of this issue is significant. Farmers nationwide want to know how their businesses are impacted by these trends.

The report describes research conducted by the author for more than a decade (1986-1999) on the concentration in the food system, particularly “concentration ratios” (CR 4s) for most of the major commodities (wheat, corn, soybeans, beef, pork, turkeys) produced in the Midwest. The economic literature suggests that if four firms had 40 percent of the market for a particular commodity, that market was no longer competitive. The data have become increasingly difficult to obtain over time due to industry confidentiality. However, concentration ratio data show that four firms (out of hundreds of processors) easily control over 40 percent of the processing of the major commodities produced in the Midwest and that a few firms appear in the list of top four processing firms for several commodities. The data also indicate there is significant vertical integration of these commodities, i.e., one firm may rank in the top four for producing the feed, feeding the animals and processing the animals. The authors note that the relationships in the food system have become extremely complex. Firms are constantly merging, forming joint ventures, partnerships, and contracts, not to mention a variety of less formal side agreements and alliances with different players. To show the kind of information needed to understand the complex relationships and concentration in the global food system, the report diagrams some of the working relationships among dominant firms. The concept of a “cluster of firms” is used to represent the new economic arrangements often seen.

The information in this report is organized around three major emerging clusters of firms that control the food system from genetic resources to the supermarket shelf: Cargill/Monsanto, ConAgra, and Novartis/ADM. In such clusters, the food product is passed along from stage to stage, but ownership

and the location of the decision-making never changes. Farmers in these systems may play a role in growing the product by providing the labor and often some capital investment, but they do not own the product, nor do they make major management decisions about it.

The authors predict that eventually there will be four or five major food clusters which will exercise control over decisions throughout the food system. This prediction is based on an assumption that biotechnology will be accepted by most of the world's nations. This may then accelerate concentration in the food system through the control these clusters will have on intellectual property rights (agreements for the patented genetic resources).

From their analysis of food chain clusters, the authors suggest that the issue is not who can produce the food/fiber product the most efficiently, but who is large enough to control the market share. The more "integrated" the commodity system, the less access to a market the independent producer will have. This has been especially true in livestock systems. The authors point out that two recent technologies will hasten the process of vertical integration and reduced market access for individual farmers in the crop sector: biotechnology and the use of precision farming techniques like global positioning systems (GPS). The question the authors ask is, if the integrated firm becomes the management unit or "farm," how many farms will there be in the United States in the future?

### **Concerns about food system sustainability**

As a rural sociologist, Heffernan raises the concern about the consequences of this restructuring for rural communities. Rural communities are contributing less and less economically to their communities, primarily because of this emerging food system structure. In the past, the predominant system of family businesses would generate "multiplier effects" of three or four, meaning for example, that farm sales of \$100 would lead to additional purchases from various local businesses of another \$300, thus greatly enhancing economic activity in the community. Now, large, non-local corporations employ community members as wage earners, piece rate workers or contract farmers as cheaply as possible and allocate the "profits" to a return on management and capital, usually taking them from the community to be reinvested in the global food system. Increasingly, according to the authors, our agricultural communities are looking like mining communities. The major decisions are being made, not by the residents of communities but by an ever-declining number of firms, many of which are involved in a few food system clusters.

Another concern raised is the apparent contradiction between the market opportunity that the growing world population will provide for farmers in the United States and the fact that most of this growing population cannot afford to purchase food imports. In fact, global firms "source" their products from countries that produce them the cheapest and sell them to countries that will pay the most. Will countries with rapidly growing populations be our farmers' customers or their competitors? It is interesting to note that on a dollar basis, food exports and imports to the U.S. have been growing at the same level for the past two decades. For example, about one-third of vegetables consumed in the U.S. are imported, and the U.S. is a net importer of beef.

The long-term sustainability of a food system dependent on cheap petroleum

for its production, processing and distribution is another concern. Will a price increase cause the whole food system to restructure again? The authors point out that the food system is becoming more like other economic sectors, yet, it is fundamentally different from many of them because food is a human necessity needed on a regular basis. So, according to the authors, “those who control the global food system have the ultimate in economic power.”

The authors conclude that the evolving food system is vulnerable on many levels. It will probably be restructured again in the future. The question is, they ask, at what social and economic cost and to whom? The report strongly recommends the need for a public debate to ask critical questions about the emerging structure of the food system, about alternative structures, and about what is in the best interest of this and future generations.

This reviewer [Gail Feenstra] suggests that more research, analysis and discussion involving the farming community and the larger public in California is needed so that society can understand the larger dynamics of the food system and make more informed decisions about what we want our roles to be.

For more information: William Heffernan, Department of Rural Sociology, University of Missouri, Columbia, Missouri. National Farmers Union, 11900 East Cornell Ave., Denver, CO 80014. Web site: [www.nfu.org](http://www.nfu.org)

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*Contributed by Gail Feenstra*

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## **Technical Reviews**

# **Water Quality in the San Joaquin-Tulare Basins: California, 1992-1995.**

*Neil M. Dubrovsky, Charles R. Kratzer, Larry R. Brown, JoAnn M. Gronberg and Karen R. Burrow*

U.S. Department of the Interior, U.S. Geological Survey, Circular 1159. 1998

*This 38-page report contains full references, a glossary, multiple full-color maps, figures, photos, and data tables.*

## **The National Water Quality Assessment Program**

United States Geological Survey (USGS) Circular 1159 is part of the National Water Quality Assessment (NAWQA) Program, the USGS' large scale environmental water monitoring. NAWQA's mission is to "provide a strong and unbiased basis for better decision making by... the United States Congress, Federal, State, and local agencies, environmental groups, and industry. Information from the NAWQA Program also will be useful for guiding research, monitoring, and regulatory activities in cost effective ways."

NAWQA studies look at both groundwater and surface water in 60 watersheds or groundwater basin areas, which represent drinking water sources for 70 percent of the U.S. population. Generally, the studies monitor the presence, source, and destination of pesticides, nutrients, volatile organic chemicals, and trace elements. Aquatic ecosystem health is also assessed through water chemistry and the presence or absence of native and introduced species.

## **NAWQA and the San Joaquin-Tulare Basins Study Unit**

Circular 1159 describes the San Joaquin-Tulare Basin Study Unit which covers 31,200 square miles in the San Joaquin Valley, the eastern slopes of the coast range, and the western slopes of the Sierra Nevada Mountains. Larger cities in the basins include Bakersfield, Visalia, Fresno, Merced, Modesto, and Stockton. Environmental measurements for this study were conducted from 1992-1995. Although Circular 1159 is an integral part of a national study, it also is intended to serve as a stand-alone resource for those interested in water quality in California.

## **Definitions of Criteria and Levels of Detection**

When the NAWQA researchers measure pollutants in the water, they compare their findings to previously defined criteria (also called standards or guidelines). The United State Environmental Protection Agency (US-EPA), state, and other agencies have previously published these criteria as the maximum allowable concentrations of pollutants in water that are safe for a certain use. The two common uses are drinking water for humans or

supporting aquatic life. Criteria can also be defined as “acute” concentrations, possibly causing immediate harm, or much lower “chronic” concentrations, possibly causing harm through continued exposure over long periods of time.

The analytical methods used to detect chemical contaminants have dramatically improved in recent years. Very small amounts of chemicals can be detected. The level of detection for some chemicals is so low that most scientists agree these low concentrations pose no immediate threat to human or aquatic health. Concentrations of contaminants need to be compared to criteria and monitored over time to make sure the concentrations are not increasing.

### **Selected Major Issues and Findings for Surface Water**

- A wide variety of pesticides occur in the San Joaquin River and its tributaries, some at concentrations high enough to adversely impact aquatic life.
- Fish communities in the lower San Joaquin River were highly degraded compared with other NAWQA Study Units, or regions, as was stream habitat at some sites.
- Some nitrate and ammonia concentrations exceed criteria in some small tributaries, but generally do not limit beneficial uses in the main stem of the San Joaquin River.
- Long-banned organochlorine insecticides continue to be transported to streams by soil erosion of contaminated agricultural fields, resulting in contamination of suspended sediment, bed sediment, and aquatic organisms. During measurements made in June 1994, and during the winter storms of January 1995, most whole-water concentrations of p,p'-DDT, chlordane, dieldrin, and toxaphene exceeded chronic criteria for the protection of freshwater aquatic life.
- Forty-nine pesticides were detected in the San Joaquin River and three subbasins, 22 of which were detected in more than 20 percent of the samples. No drinking-water standards were exceeded, but the concentrations of seven pesticides exceeded the criteria for the protection of aquatic life.

### **Selected Major Issues and Findings for Ground Water**

- Nitrate concentrations in ground water frequently exceeded drinking water standards; however, pesticide concentrations rarely exceeded drinking water standards, with the notable exception of 1,2,-dibromo-3-chloropropane (DBCP). DBCP is a soil fumigant banned since 1977.
- Nitrate concentrations in ground water in the eastern San Joaquin Valley exceeded the US-EPA drinking water standard in about one-fourth of the domestic water supply wells sampled.
- Nitrate concentrations in ground water have increased since the 1950s. From 1950 to 1980, the largest source of nitrate–nitrogen fertilizer–also increased from 114 to 745 million pounds per year.
- Pesticides were detected in about two-thirds of the ground water samples collected from domestic water supply wells, but concentrations of most pesticides were low—less than 0.1 microgram per liter ( $\mu\text{g/L}$ ).
- Pesticide concentrations in ground water generally have not increased in the last decade on the basis of a small number of wells sampled (19) during 1986-87 and again in 1995. Direct comparison of the data is difficult because of changes in detection limits.

This report is free upon request by contacting, U.S. Geological Survey  
Information Services, Box 25286 Federal Center, Denver, CO 80225. A  
complete color version is available on line at  
<http://water.usgs.gov/pubs/circ1159>

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*Contributed by Max Stevenson*

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## ***Technical Reviews***

# **Pesticide Data on the Web**

### **Pesticide residues in food**

The Pesticide Data Program, run by the USDA's Agricultural Marketing Service since 1991, buys food from grocery stores, prepares it as consumers would, and then analyzes the food for more than 160 different pesticides. Results are published and posted on the Web at [www.ams.usda.gov/science/pdp/](http://www.ams.usda.gov/science/pdp/)

### **Pesticide residues in the environment**

The California Department of Pesticide Regulation has the job of regulating and monitoring pesticide use in California, and has produced many high quality studies and reports over the years. Now many reports are available for download on the Web, including the 1999 updates to "Sampling for Pesticide Residues in California Well Water-1997 Update of the Well Inventory Database" at [www.cdpr.ca.gov/docs/empm/pubs/ehapreps.html](http://www.cdpr.ca.gov/docs/empm/pubs/ehapreps.html)

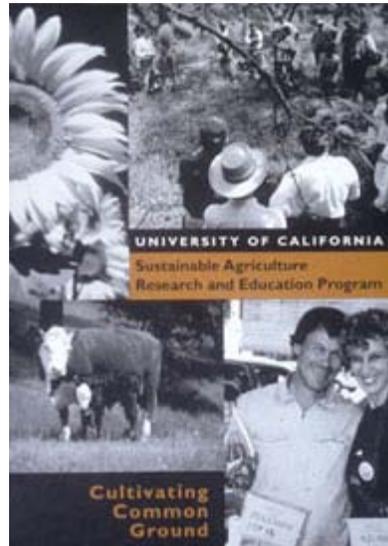
### **Quantity of pesticides used in agriculture**

The California Department of Pesticide Regulation oversees California's Pesticide Use Reporting (PUR) database. The complete database from 1990 to present can be ordered on CD-ROM. Summary data reports can be found at [www.cdpr.ca.gov/docs/pur/purmain.html](http://www.cdpr.ca.gov/docs/pur/purmain.html) and [www.ipm.ucdavis.edu/PUSE/puse1.html](http://www.ipm.ucdavis.edu/PUSE/puse1.html) (See "Sources of Pesticide Use Data in California," Sustainable Agriculture 11(2):10-12.)

*Contributed by Max Stevenson*

## New Biennial Report Highlights SAREP Work 1997-1999

SAREP, now in its 14th year, highlights the last two years of program work in *UC SAREP Biennial Report 1997-1999: Cultivating Common Ground*. In the last three years SAREP has awarded more than \$2.9 million in sustainable agriculture grants to both university and other applicants. Much of the funding went to support broad research and education partnerships within a particular region or commodity. For example, the Biologically Integrated Farming Systems (BIFS) program awards funds to farmers, farm advisors, and agricultural professionals to create strategic partnerships for agricultural chemical use reduction in winegrapes, walnuts, prunes, rice, citrus, strawberries, apples and other commodities. The Community Development and Public Policy grants provide resources for food systems research and community-based initiatives that will lead to greater food security for urban residents and simultaneously forge stronger connections with local growers.



SAREP Biennial Report 1997-1999

“Sustainable agriculture has emerged as a conceptual tool with a clear research and policy agenda for addressing the challenges confronting agriculture and food systems in California,” says **Sean L. Swezey**, SAREP director. “We’re proud to share our biennial report, which details the way our program is helping to meet these challenges.” A limited number of printed copies of UC SAREP Biennial Report: 1997-1999 are available free from the SAREP office. Contact the office at SAREP, University of California, One Shields Ave., Davis, CA 95616-8716; Tel: (530) 752-7556; email: [sarep@ucdavis.edu](mailto:sarep@ucdavis.edu). The report is available on SAREP’s World Wide Web site at: [www.sarep.ucdavis.edu/pubs/progress/97-99/](http://www.sarep.ucdavis.edu/pubs/progress/97-99/) The report is presented in PDF format and includes summaries of funded projects.

## Organic Apple Production Manual

More than 20 years of research by UC scientists, farm advisors, growers and the USDA's Sustainable Agriculture Research and Education Program (SARE) have culminated in the first production manual from the University of California for current or potential producers of certified organic apples.

“Both organic and conventional growers will find that this manual is a good starting reference for those seeking options to problems of pesticide resistance, postharvest residues, farmer and farmworker health and safety, and future regulatory restrictions,” says **Sean L. Swezey**, SAREP director and co-author of the publication. “Those considering the transition to organic production and certification will find guidelines on what records to keep, who to contact, and what to expect while making the transition.”

The manual includes a review of the organic apple industry including trends in production and markets, supply and price, and state and federal regulation and certification. Chapters include orchard management, disease and pest management, harvest and postharvest operations, marketing considerations, and economic performance. It also includes the methods legally available for organic market production in California, with a bibliography of publications useful to organic growers.

In addition to Swezey, co-authors include UC Cooperative Extension farm advisors **Paul Vossen** (Sonoma County) and **Janet Caprile** (Contra Costa County), and UC Area IPM specialist **Walt Bentley** (Kearney Ag Center, Parlier).

The 72-page publication is illustrated with 20 photographs and 19 tables. To order, contact University of California ANR Communication Services, 6701 San Pablo Ave., Oakland, CA 94608-1239; Tel: (800) 994-8849 or (510) 643-5470; Fax: (510) 643-5470; Web site: [anrcatalog.ucdavis.edu](http://anrcatalog.ucdavis.edu). Refer to Publication Number 3403; the cost is \$18 plus shipping and handling (California residents add 8.25 percent sales tax). Payment may be made by VISA or MasterCard, or check or money order payable to “UC Regents.”

## Three New Community Food Systems Reports

***A Case Study of the Davis Farmers' Market: Connecting Farms and Community,***

15 pages, March 2000, Heather Podoll, UC SAREP. Free.

***A Case Study of the Laytonville Farmers' Market: A Rural Community Market,***

9 pages, March 2000, Christopher J. Lewis, UC SAREP. Free.

***Increasing Connections between Farmers and Communities in Stanislaus and Merced Counties,***

22 pages, June 2000, Gail Feenstra and Robin Kozloff, UC SAREP. Free.

Two case studies of farmers' markets and a report on connections between farmers and communities have been released by SAREP. The case studies, which detail the Davis Farmers' Market in Yolo County and the Laytonville Farmers' Market in Mendocino County, are part of a study on retail farmers' markets and rural development. The multistate project, funded by the USDA's Fund for Rural America, also includes researchers at Cornell University and Iowa State University.

"It's been very interesting to contrast a small rural market like the one in Laytonville with the much larger, more urban market in Davis," says **Gail Feenstra**, SAREP food systems analyst and the California principal investigator of the project. "There are some similarities, for example, in the way that both size markets act as incubators for small businesses, and there are differences in the way that the more rural market was the impetus for the development of a community kitchen."

Feenstra was also a principal investigator on the report about increasing connections between farmers and communities in Stanislaus and Merced counties. The report was part of a study "Increasing Adoption of Sustainable Agriculture and Positive Community Impacts" conducted by researchers from UC Davis, the Community Alliance with Family Farmers, and the Lodi-Woodbridge Winegrape Commission. That study was also funded by the USDA's Fund for Rural America.

"Our project was to investigate the factors that lead to the adoption of more sustainable farming practices in California's upper San Joaquin Valley, and also to find out how these biologically based farming systems can positively impact local rural communities," says Feenstra. "We interviewed many stakeholders to gather our data about perceptions of farmland preservation, local marketing, and sustainable agriculture, and were able to offer observations and recommendations."

All three reports are available in limited quantities free of charge from the

SAREP office at One Shields Ave., University of California, Davis, CA  
95616-8716; Tel: (530) 752-7556; email: [sarep@ucdavis.edu](mailto:sarep@ucdavis.edu). The reports are  
also available on SAREP's Web site at [www.sarep.ucdavis.edu/cdpp/](http://www.sarep.ucdavis.edu/cdpp/)

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## Print Publications

### Winegrape Resource Guide

*Growers' Guide to Environmental Regulations & Vineyard Development*, 100 pages, May 2000, **Janet C. Broome, Lisa C. Scott** and **Bonnie Hoffman**, SAREP; produced by the California Association of Winegrape Growers. SAREP authors developed this resource guide at the request of the California Association of Winegrape Growers (CAWG) to describe environmental issues and federal, state, and county regulations related to vineyard development. It identifies environmental and human resources to be protected and considered in vineyard development; existing regulatory programs, including county ordinances and permits, state and federal laws; necessary steps for complying with existing regulations; and describes resources for growers seeking more information, including publications and agency contacts. For information and to get a copy, please contact CAWG at 555 University Ave., Suite 250, Sacramento, CA 95825; Tel: (916) 924-5370 or (800) 241-1800; Fax: (916) 924-5374; Email: [info@cawg.org](mailto:info@cawg.org); [www.cawg.org](http://www.cawg.org); Web site: [www.cawg.org](http://www.cawg.org)

### Compost Quality

*Compost: Matching Performance Needs with Product Characteristics*, 4 pages, 2000, California Integrated Waste Management Board. This document offers information on evaluating compost based on individual farmers' specific needs, and suggests questions to ask compost producers. It is available free of charge. Contact **Bertie Mora** at (916) 255-2708 or email [bmora@ciwmb.ca.gov](mailto:bmora@ciwmb.ca.gov). Compost suppliers may also be located on the Integrated Management Board's Organics Outlook Web site at [www.ciwmb.ca.gov/organics/farming](http://www.ciwmb.ca.gov/organics/farming).

### Pesticide Use Analysis

*Hooked on Poison: Pesticide Use in California 1991-1998*, 84 pages, 2000, **Susan Kegley, Stephan Orme**, and **Lars Neumeister** of Pesticide Action Network (PAN), published by Californians for Pesticide Reform (CPR). The authors use the California Department of Pesticide Regulations pesticide use data to analyze state trends for different commodities and categories of chemicals. Their analysis shows that in California there is continued high use of pesticides. The report includes four appendices covering data sources and methodology, pesticide use statistics, agricultural pesticide use by crop, and pesticide use by county and region. It is available on-line at [www.igc.org/cpr/ur2hooked.html](http://www.igc.org/cpr/ur2hooked.html), or in hard copy by contacting Californians for Pesticide Reform at (888) CPR-4880 (in California), or Pesticide Action Network at (415) 981-1771; Web site: [www.panna.org](http://www.panna.org). The first copy is free within California; the cost is \$10 for additional copies and out-of-state orders.

### Eat Locally Cookbook

*Eating Fresh Guides: Cooking Fresh from the Bay Area*, 178 pages, 2000. Legendary chefs and food systems activists are among the contributors to "Cooking Fresh from the Bay Area," the newest in the series of regional cookbooks which aim to connect consumers to local agriculture. **Gail Feenstra**, food systems analyst for SAREP, contributed an article about the

human scale of farmers' markets. She writes about how local food choices and seasonal recipes can strengthen communities. The volume is \$17.95 plus tax and shipping, and is available at bookstores or through Eating Fresh Publications at (609) 466-1700 or [info@eatingfresh.com](mailto:info@eatingfresh.com).

## Web Sites

### High Use on SAREP Site

[www.sarep.ucdavis.edu/](http://www.sarep.ucdavis.edu/)

SAREP's award winning Web Site is proving to be an important resource for many individuals worldwide. During the months of February and March this year, there were 32,400 visits to the SAREP Web site, an average of 540 visits per day. (A visit is a collection of requests that represent all the pages on this Web site seen by a particular visitor at one time.) Some of the most popular sections include *Publications* (newsletter, reports, books, videotapes), *Crop & Livestock Production Information* (including cover crop resources and earthworm information), and the program concept paper *What is Sustainable Agriculture?*

A recent addition to the Web site is the 1997-1999 Biennial Report available at [www.sarep.ucdavis.edu/pubs/progress/97-99/](http://www.sarep.ucdavis.edu/pubs/progress/97-99/). (See article above)

If it's been a while since you visited the SAREP site, you will also find a new section, *Community Development/Public Policy*, which includes links to SAREP-funded projects on these topics, and provides information for community groups interested in strengthening local food systems. In addition, full reports of selected projects are available at <http://www.sarep.ucdavis.edu/grants/Reports/>.

During the summer months, SAREP staff will be undertaking a major upgrade to the Web site, including the addition of an on-line database of funded projects. Visit often to see what new features and information are available. The program is interested in feedback on the Web site; please contact **Lyra Halprin**, SAREP public information officer, with comments or suggestions on the Web site at (530) 752-8664 or [lhalprin@ucdavis.edu](mailto:lhalprin@ucdavis.edu)

### New SAREP-Funded BIFS sites

Two new SAREP-funded Biologically Integrated Farming Systems (BIFS) projects have new Web sites. Check them out:

Prune BIFS (IPFP)

[www.agresearch.nu/ipfp.htm](http://www.agresearch.nu/ipfp.htm)

Rice BIFS

[www.buttecounty.net/BIFSinRice](http://www.buttecounty.net/BIFSinRice)

### Consumer Links to Local Food

[farmersmarket.ucdavis.edu/](http://farmersmarket.ucdavis.edu/)

This is the Web site of the California Federation of Farmers' Markets. It allows users to find a California Certified Farmers' Market in any location in the state by zip code, offers regional commodity information for the state, includes recipes and links to ag-related sites, and offers other information. Funding and support for the site was provided by the USDA, the California Federation of Certified Farmers' Markets, the University of California Small

Farm Center, UC SAREP and the Davis Farmers' Market.

[www.LocalHarvest.org](http://www.LocalHarvest.org)

LocalHarvest.org is a new site established by Ocean Group, an Internet engineering company, to help consumers find locally grown foods sold by farmers. It offers information on selected farmers' markets, farm stands, U-Pick farms and community supported agriculture (CSA) projects throughout the U.S. It is seeking input from users and growers to increase its database of farmers' markets, stands, farms and CSAs.

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## Sources of Funding

### Policy Research Funding

The California Policy Research Center (CPRC) of the University of California is seeking proposals under its Policy Research Program from UC faculty to conduct research on significant policy issues facing California. A broad range of topical areas will be considered; successful proposals will examine current and anticipated state policy concerns, aid in developing policy approaches, and/or evaluate policy implementation.

A minimum of \$250,000 will be awarded in this funding cycle (July 1, 2001-June 30, 2002), with the possibility of additional funds becoming available. Typically, six to eight research proposals are funded, with a 12-month project time frame.

Proposals are due **October 13, 2000**. Prior to submission, CPRC requests that interested applicants submit a short letter of intent by **August 14, 2000**.

The RFP was mailed to selected UC deans, chairs, and faculty, and may be downloaded from the CPRC Web site at [www.ucop.edu/cprc/cprccall2001.html](http://www.ucop.edu/cprc/cprccall2001.html) or requested in hardcopy by emailing the program at [cprc.grants@ucop.edu](mailto:cprc.grants@ucop.edu)

### USDA Western SARE Grants

The next open application period for competitive grants sponsored by USDA Western Sustainable Agriculture Research and Education (Western SARE) has begun. Western SARE has three competitive grants programs: SARE grants, which fund research and education on sustainable farming and ranching practices; the Professional Development Program, which supports efforts to educate agricultural professionals about sustainable agriculture; and, Farmer/Rancher Research Grants, which support producer-directed research and community development activities.

Calls for proposals are automatically mailed to those on the distribution list at the time the call is released, or sent out individually during the application period. To add your name to the distribution list or to get an application, contact the Western SARE headquarters office and indicate the grant effort in which you are interested:

Western SARE Program  
Utah State University  
4865 Old Main Hill  
Logan, UT 84322-4865  
(435) 797-2257  
[wsare@mendel.usu.edu](mailto:wsare@mendel.usu.edu)

Calls for proposals—as well as funded project results and more—are also

available at the program's Web site at <http://wsare.usu.edu>

## Organic Research Grants

The Organic Farming Research Foundation (OFRF) invites applications for research grants of up to \$10,000 for consideration in its twice-yearly funding cycle. Funds are offered for organic farming research, dissemination of research results to organic farmers and growers interested in making the transition to organic production, and consumer education on organic farming issues. OFRF technical program coordinator **Jane Sooby** is available to work with farmers and others interested in doing on-farm research and applying for grants. The foundation's new on-farm research guide gives an overview of the research process and is accessible through OFRF's Web site ([www.ofrf.org](http://www.ofrf.org)) under "research program" or can be ordered free of charge by calling OFRF at (831) 426-6606. The deadlines for proposal consideration are July 15 for the fall funding cycle, and January 15 for the spring funding cycle. Contact Sooby at OFRF, PO Box 440, Santa Cruz, CA 95061 or email [research@ofrf.org](mailto:research@ofrf.org) or [jane@ofrf.org](mailto:jane@ofrf.org)

## Pest Management Grants

The California Department of Food and Agriculture's Department of Pesticide Regulation (DPR) is offering funding for reduced-risk pest management projects. Four proposal options are being offered. They include:

- 1) Applied Research Grants for university researchers, private groups and government entities to develop new reduced-risk practices or refine existing practices. Up to \$30,000 per year is available. Proposals are due **Oct. 6, 2000**.
- 2) Demonstration Grants for university researchers, private groups, non-profit organizations, government entities and others to address local or regional pest management challenges. Projects typically involve practical demonstration or reduced-risk practices on private or public property. Up to \$50,000 per year is available. Proposals are due **Oct. 6, 2000**.
- 3) Evaluation Grants are required as a preliminary step for the Pest Management Alliance grants (the fourth grant option). Evaluations describe an existing pest management system. Groups can receive up to \$10,000 to prepare an evaluation. Proposals are due **Sept. 14, 2000**.
- 4) Alliance Grants are to help commodity groups, non-agricultural groups, and urban groups address pest management issues on a regional or statewide scale. Groups can receive up to \$100,000 per year, with a required dollar-for-dollar match. Proposals are due **November 1, 2000**. For more information on the grants, download complete Request for Proposal bid packages at the DPR Web site: [www.cdpr.ca.gov/dprgrants.htm](http://www.cdpr.ca.gov/dprgrants.htm), or contact **Bob Elliott** at DPR, 830 K Street, Room 200, Sacramento, CA 95814-3510; Tel: (916) 324-4100; Fax: (916) 324-4088; Email: [belliot@cdpr.ca.gov](mailto:belliot@cdpr.ca.gov).

## **Calendar**

### **\* SAREP WEB CALENDAR**

SAREP offers a sustainable agriculture calendar at: [www.sarep.ucdavis.edu/](http://www.sarep.ucdavis.edu/) (click on "Course, Workshops, Events"). Please feel free to add sustainable agriculture events.

### **\* NATIONAL/INTERNATIONAL CALENDAR**

The National Agricultural Library maintains a calendar at [www.agnic.org](http://www.agnic.org) It links to more than 1,200 major national and international agricultural conferences.

### **\* MONTHLY MEETINGS**

*Lighthouse Farm Network* The Community Alliance with Family Farmers Foundation sponsors informal monthly meetings for growers to discuss issues related to pesticide use reduction. Contact: Reggie Knox, CAFF, (831) 457-1007, [reggie@cruzio.com](mailto:reggie@cruzio.com).

## **AUGUST**

**19** *Organic Foods 2000: Challenges and Opportunities*, Sheraton Seattle Hotel & Towers, Seattle, Wash. Co-sponsored by the American Association of Cereal Chemists & the American Phytopathological Society. To register: (651) 454-7250; Fax: (651) 454-0766; [aacc@scisoc.org](mailto:aacc@scisoc.org); or write to: AACC, 3340 Pilot Knob Road, St. Paul, MN 55121

## **SEPTEMBER**

**16** *Fairfield-Suisun Food Security Harvest Faire*, St. Mark's Church, Fairfield, Solano County. Faire funded by SAREP. Contact: Diane Metz, UC Cooperative Extension, Solano County, (707) 421-6790.

## **OCTOBER**

**10-11** Community Food Security Symposium, Sponsors: UC Food Security Workgroup, SAREP. Site: UC Berkeley. Keynote speakers: Jan Poppendieck, Hunter College; Kathy Lawrence, Just Food. Panels, round table discussions, concurrent sessions, tours. Contact: Lucia Kaiser, UC Davis, (530) 754-9063; [llkaiser@ucdavis.edu](mailto:llkaiser@ucdavis.edu)

**19-20** *Understanding the Challenges & Opportunities for Eco-labels & Eco-brands*, Food Alliance conference, Portland Hilton, Portland, Ore. Contact: Theresa Steig, (206) 524-5302; [www.thefoodalliance.org](http://www.thefoodalliance.org)

**20-22** *Bioneers Conference: Revolution from the Heart of Nature—Visionary & Practical Solutions for Restoring the Earth*. Marin Center, San Rafael, Calif. Speakers: Wes Jackson; Joel Salatin; Paula Gunn Allen; Alice Walker.

Contact: Bioneers/CHI, 901 W. San Mateo Rd., Ste. L, Santa Fe, NM; Tel (toll free): (877) 246-6337 or (505) 986-0366; Fax: (505) 986-1644; [chisf@bioneers.org](mailto:chisf@bioneers.org); [www.bioneers.org](http://www.bioneers.org).

**29-31** *Community Food Security Coalition 4th Annual Conference*, Santa Fe, New Mexico. Presentations on food, farming, hunger, policy, youth & communities, rural-urban issues, regional issues. Contact: Community Food Security Coalition, PO Box 209, Venice, CA 90294; Tel: (310) 822-5410; Fax: (310) 822-1440; [asfisher@aol.com](mailto:asfisher@aol.com)

**31-Nov 2** *Marketing Outreach Conference for Limited Resource Farmers and Ranchers*, Coop. State Research, Educ. & Exten. Service/USDA's Ag. Marketing Service, Double Tree Inn, Modesto, CA. Marketing skills, tools, & opportunities required for success. Karen Jameson, Ag. Marketing Service, (202) 720-5731, [Karen.Jameson@usda.gov](mailto:Karen.Jameson@usda.gov)

## NOVEMBER

**17-19** *16th Annual California Farm Conference: Healthy Farms, Healthy Communities*, Santa Rosa Junior College. Sponsors: Community Alliance with Family Farmers, Occidental Arts & Ecology Center, UC Small Farm Center, UC Cooperative Extension, Santa Rosa Junior College, Golden Gate Marketing Assoc., USDA Farm Services Agency, Southland Farmers Market Assoc. 2-day registration: \$90; half-day short course: \$25. Call (530) 888-9206; [www.californiainfarmconference.com](http://www.californiainfarmconference.com); or email: [fullcircle@jps.net](mailto:fullcircle@jps.net)

**27-30** *Managing Watersheds in the New Century*, 8th Biennial Watershed Management Council Conference, Asilomar Conference Center, Monterey/Carmel. Watershed Management Council, c/o PSRP, Univer. of Calif., One Shields Ave., Davis, CA 95616-8688; (510) 273-9066; Fax: (510) 530-4640; [wmc@watershed.org](mailto:wmc@watershed.org)

## JANUARY 2001

**24-27** *21st Annual Ecological Farming Conference*, Asilomar, CA. Contact: Committee for Sustainable Agriculture, 406 Main St., Ste. 313, Watsonville, CA 95076; (831) 763-2111; [www.csa.org](http://www.csa.org)

**SUSTAINABLE AGRICULTURE** is a publication of the UC Sustainable Agriculture Research and Education Program (SAREP). SAREP provides leadership and support for scientific research and education to encourage farmers, farmworkers, and consumers in California to produce, distribute, process and consume food and fiber in a manner that is economically viable, sustains natural resources and biodiversity, and enhances the quality of life in the state's diverse communities for present and future generations.

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