

SUSTAINABLE AGRICULTURE

Farm-to-school programs in the Western Region Results from food service directors survey

by Gail Feenstra and Jeri Ohmart, UC SAREP

School districts throughout the nation are adopting new policies and programs to bring healthier, farm fresh foods from regional growers into school cafeterias. In 2005, the Kellogg Foundation provided funds to the Center for Food and Justice and the Community Food Security Coalition to explore the extent of activities nationwide and to propose a national strategy to invigorate farm-to-school programs. Five regional lead agencies were selected to find out about their own region's activities, develop communication strategies within the regions and share the results. UC SAREP was selected as the Western Regional Lead Agency, covering nine states (California, Oregon, Washington, Alaska, Hawaii, Idaho, Montana, Wyoming and Nevada). We conducted two surveys in the Western Region—one of food service directors and one of farm-to-school supporters—to gather baseline data about what activities were already occurring in cafeterias in the Western Region, and proposals for future directions. Lead agencies in the other regions also conducted the same food service directors' survey. We report results from the Food Service Directors' Survey here.



Food service worker, Davis Joint Unified School System.
(photo by Gail Feenstra)

We sent out 83 surveys to food service directors known to be doing some type of farm-to-school activities in their school or district. Forty-one food service directors responded, providing an almost 50 percent response rate. Most responses came from California and Washington, known for their active farm-to-school outreach and advocacy organizations. A few responses also came from Oregon and Montana. Most responses represented activities for entire school districts (36 responses) vs. individual schools (5 responses). School districts ranged in size from 237 to 46,200 students. For simplicity's sake, we will focus on the school district results in this summary.

What farm-to-school activities are school districts doing?

School districts were involved in a variety of activities as Table 1 shows; the most common were: conducting in-class nutrition education (92%), purchasing food from local farmers (80%), school gardens (69%) and offering farm/market visits (65%).

Most of these activities occurred most frequently at the elementary level with the exception of purchasing food from local growers, which happened at a district level.

Food procurement trends

School districts used a variety of distribution mechanisms to purchase food from local farmers. As Table 2 shows, the most common were: purchasing directly from growers (82%) and purchasing from distributors who buy from local farmers (73%). Many food service directors use multiple strategies.

For almost all distribution strategies, food service directors reported on average that only 1–5 farmers were involved.

Most food service directors (83%) purchased fresh produce from

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local farmers with a few purchasing dairy products/eggs, bread/bakery and meats/entrees locally.

Dollars spent on local produce

For total food budgets that averaged \$205,790 (range from \$2,500–\$1,000,000), the fresh produce budgets averaged \$18,300 (range from \$250–\$100,000) or about 9 percent of the total food budget. The majority of food service directors (57%) estimated they were spending up to 10 percent (approximately \$1,830 per district) of their produce budgets on local produce. All other food service directors spent even more locally, with 11 percent spending at least 40 percent of their produce budgets on local produce.

TABLE 1. School district farm-to-school activities

Activity	Percentage of respondents participating
In-class nutrition education	92%
Purchasing food from local farmers	80%
School gardens	69%
Farm or Market visits	65%
Composting/ Waste management	53%
Incorporating garden produce in cafeteria or classroom taste tests	50%
In-class snacks using local products	34%

TABLE 2. Distribution mechanisms for local produce

Distribution mechanism	Percentage of respondents using
Purchase directly from farmer	82%
Purchase through distributor who buys from local farmers	73%
Purchase from grower cooperative	52%
Purchase directly from farmers market	48%

TABLE 3. Educational activities

Educational activities	Percentage of respondents participating
Nutrition/Health education	61%
Cooking demonstrations	47%
Agricultural education	42%
Farmer in the classroom	33%
Chef in the classroom	19%
Do not know	25%
No educational activities conducted	3%

Educational activities associated with farm-to-school

Most school districts were conducting some in-class education related to their farm-to-school program. The most common was Nutrition/Health education (61%). Others are listed in Table 3.

Funding for farm-to-school activities

Many school districts helped fund their programs through a variety of outside funding sources. The most common sources were federal funds and private foundation funds as Table 4 shows.

Successful fundraising as well as the successful functioning of farm-to-school programs depends on creating diverse partnerships. Food service directors most commonly reported partnering with agriculture-focused organizations and health/nutrition organizations. Additional organizations mentioned appear in Table 5.

Partners took on many roles in farm-to-school planning and implementation. Agriculture-related organizations and parent groups, for example, were most likely to participate in a farm-to-school committee. Health/nutrition organizations were most likely to participate in event planning and farm-to-school implementation. Cooperative extension agencies were most likely to participate in event planning, while educational institutions were most likely to participate in event planning, promotion, implementation and evaluation.

Support needed

When food service directors in the Western Region were asked what they thought were the highest priorities for the region, the number one response was sustaining fundraising efforts. Second, respondents wanted help with program development (finding farmers, developing seasonal menus, bid specifications, etc.). The third priority was outreach, media and a public relations campaign.

Challenges

Food service directors had an opportunity to express, in open-ended questions, the challenges they faced. They mentioned five key challenges:

The cost of produce. This was a strong theme in responses. One respondent offered a solution: The higher cost of organic produce was managed by shifting resources. This program eliminated non-nutrient desserts and looked at other areas for savings.

Funding. Almost all respondents mentioned the necessity of external funding to initiate and maintain the program. Some suggest that these programs need to become more institutionalized and supported by the districts.

Distribution and delivery. The majority said distribution and delivery was an ongoing challenge. A few programs had worked out “broker arrangements” to connect with local farmers.

Produce quality. A number of respondents reiterated that the produce from other sources needed to be the same quality as that from traditional distributors—high quality, clean, minimally processed, safe. Other respondents were concerned about whether there would be enough produce supply to meet the demand.

Farmer relationships. Several respondents were concerned about maintaining positive relationships with their farmer-suppliers.

Keys to success

Overall, *people* seem to be keys to the success of a program. Common themes included:

Strong support from superintendents. The strong support was amplified if superintendents were also willing to commit financial resources.

Commitment and support of food service directors. Food service directors who understand the value of farm-to-school programs are more willing to work out the difficulties, especially funding and access.

A strong steering committee. Respondents said good steering committees included active parents who had a variety of complementary skills (e.g. media, grant writing, education).

Good media. Good publicity helped move the programs into the public spotlight.

Partnerships. Diverse and multiple partnerships were important to many programs.

Creating an integrated program. Several respondents mentioned the value of a multi-faceted program, including cafeteria programs, school gardens, recycling/composting programs, food/nutrition curricula, tastings, and farm visits.

Overall, food service directors were positive about their programs and hoped to see them grow and flourish.

TABLE 4. Funding sources for farm-to-school activities

Funding sources	Percentage of respondents receiving
Federal funds	39%
Private foundation funds	33%
Individual donors	22%
State funds	17%
Other sources (fundraising events, concerts, local service organizations)	14%
Local government funds	8%
Local universities/ colleges	6%
Do not receive external funding	19%
Do not know	14%

Table 5. Farm-to-school partnerships

Partnering organization	Percentage of respondents identifying
Agriculture focused organizations	58%
Health/nutrition organizations	54%
Parent groups	46%
Other (unidentified)	38%
Cooperative Extension	31%
Educational institutions (colleges, universities)	27%
Faith-based, religious organizations	4%

International scholar with farm roots to head UC sustainable ag programs

Thomas Tomich, a California-trained agricultural economist with a doctorate in food systems research, has been selected to lead the statewide Sustainable Agriculture Research and Education Program (SAREP) and UC Davis’ new Agricultural Sustainability Institute. In connection with his appointment, he has been named professor and first holder of the UC Davis W.K. Kellogg Endowed Chair in Sustainable Food Systems.

Tomich has been global coordinator of the Alternatives to Slash-and-Burn (ASB) Programme, which is hosted by the World Agroforestry Centre, headquartered in Nairobi, Kenya. Tomich will be based at UC Davis and will transition to his new duties in January 2007.

Tomich, a native of the Sacramento Valley, said he looks forward to re-establish-

ing contact with California growers and other statewide stakeholders including consumers and nonprofits.

“I’m delighted and honored to be taking the job at UC Davis and in the UC system, and also glad to be returning to my family’s farm roots in Northern California,” said Tomich, who brought apricots, peaches, plums and figs from his father’s farm in Orangevale (northeast of Sacramento) when he signed the UC offer.

“The UC system, and the Davis campus in particular, can play a central role in developing the scientific foundations for sustainable agriculture in California and for the planet,” he said. “To me, sustainability means a healthy bottom line for farmers, thriving rural communities, wholesome and nutritious food, and a healthy environment.”

W.R. “Reg” Gomes, UC ANR vice president, said that the new position represents a significant milestone in the evolution of agricultural sustainability as a priority for ANR.



Tom Tomich

Tomich received his bachelor’s degree in economics from UC Davis, and master’s degree and Ph.D. from Stanford University’s Food Research Institute in agricultural production economics, and food consumption economics and human nutrition.

Read full news release at <http://news.ucanr.org/newsstorymain.cfm?story=824>

Good night, good luck, & keep eating your vegetables

This is my last column as interim Director of SAREP, and I want to thank all of the SAREP staff, UC staff more generally, and all of you who have taken time from your busy days to contact me over the last two years. I have learned a great deal in my time with SAREP. The staff at SAREP are extremely professional, and have gone well above the call of duty to make me feel welcome and to enrich my life with wisdom and friendship. I also want to particularly thank **Maxwell Norton**, our ANR program leader and **Rick Standiford**, ANR associate vice president, who have been very helpful to me and very supportive of SAREP.

Professor **Tom Tomich**, a distinguished California native currently with the World Agroforestry Centre in Kenya, will take over the reins of SAREP and UC Davis's new Agricultural Sustainability Institute (ASI) in January. I'll be leaving in November; I have accepted the position of dean of the College of Land and Food Resources at the University of Melbourne. This will be my second migration to Australia, having served previously at the University of Adelaide. I will miss friends and family in the U.S., but will continue to stay in touch, especially with California agriculture.

In my last column for SAREP, I'd like to discuss increasing concerns that I have about a key part of social sustainability: cohesion of the agricultural community. With the many pressures that face agriculture, it is critical that all sectors of agriculture and the broader community try to cooperate in a common goal of a profitable and sustainable future, where all growers are able to make choices about what they see as their best path forward, so long as they meet regulatory standards for environmental protection and food and worker safety.

I've been focused on this topic by the most recent media coverage of agriculture, the sad tale of contaminated spinach. Almost immediately, concerns were raised about

whether this was due to the use of manures or other organic practices, or due to large farms. Of course, it need not be any of these, because the potential sources of vegetable contamination can affect even careful organic and conventional farms, large or small. After a review of circumstances and discussions with colleagues who have visited there, I am convinced that the company at the focus of attention had taken food safety very seriously, and this tragedy could have befallen others.

UC Davis agricultural economist **Dan Sumner** has estimated that the spinach crisis could cost the state's industry between \$50 million and \$100 million. The FDA ban has extended to all spinach growers, conventional or organic, even those who have not been linked in any way to the crisis. This is far from the first case of contamination. Between 1982 and 2002, there were at least 38 documented episodes of *E. coli* contamination of produce across the U.S., each involving between two and 736 people, representing 34 percent of all food borne cases, including lettuce and other salad greens, apple juice, melons and sprouts (cdc.gov/ncidod/EID/vol11no04/04-0739.htm). Since 1995, nine *E. coli* outbreaks have been traced to California's Salinas Valley, the nation's biggest producer of leafy greens.

For the protection of all agricultural fresh food markets and human health, it is time to consider more careful mandatory restrictions in production practices for fresh vegetables and fruits like melons, complete with formal auditing. We may also have to consider cooking more of our produce, which is the common practice in Asia.

For an historical precedent, consider apple juice. As a result of a contamination incident in 1998, apple cider and juice that are shipped must either be pasteurized or, if sold

raw, carry a warning label on the potential for harmful bacteria in the product. Through at least 2002, only two outbreaks due to unpasteurized apple cider have been reported, including one that carried a warning label (cdc.gov/ncidod/EID/vol11no04/04-0739.htm). When *E. coli* was plaguing meat products, the meatpacking industry reviewed its

operations. After two key changes—washing cows before slaughter to remove pathogens and rigorous sanitation in hide removal—*E. coli* substantially declined.

I doubt that the cause of the spinach tragedy will ever be found, due to the difficulties of bacterial detection. In none of the last 20 outbreaks in produce did investigators isolate a cause. In addition to care with water and sanitation, however, the scientific literature suggests outbreaks might be avoided if the use of manures is more thoroughly researched, and if safe temperatures are more strictly enforced. A recent USDA study by **David Ingram** and **Patricia Millner** has also raised questions about the safety of compost teas. ["Recommendations for a Safer Compost Tea," <http://ars.usda.gov/is/pr/2006/060921.htm>]

However, I suggest there are other lessons from the spinach episode. Even though organic practices were not likely responsible, the fact that an organic company was involved invited criticism from conventional agriculture, which had been previously criti-



Rick Roush

cized by organic ag. As in any other human endeavor, attacks by one sector of agriculture on another invite reprisals.

Such discord cannot be a good thing for agriculture as a whole. My wish for California agriculture is that all sectors show greater respect for the various choices that people

make in their practices, and take greater care to co-exist rather than criticize (or jump to conclusions about) the choices made by others. Bad press for one part of California ag will surely generate an appetite for more bad press, to no one's benefit and at great costs to California's reputation in the market place. As

Ben Franklin said, "We must indeed all hang together, or, most assuredly, we shall all hang separately." It is time to try to hang together.—*Rick Roush, interim director, University of California Sustainable Agriculture Research and Education Program*

UC SAREP funds Placer harvest calendar

Farmers, farm advisors and community members have developed a calendar to promote regional agricultural products in Placer County. With a grant from UC SAREP, Placer and Nevada counties farm advisor **Cindy Fake** and the area's "Farm and Barn Tour" committee developed a calendar of art-quality images of local produce to build

awareness and stimulate consumption of regional ag products. The 13-month 2007 calendar includes farmers market hours, listings for area fairs, festivals, and farm tours. Each month features an agricultural product and its nutritional information, and a list of seasonal produce. Placer County producers, their crops, addresses and contact information

is listed at the end of the calendar. The full-color 9"x12" calendar is available in person or by mail at the UC Cooperative Extension office, 11477 E Ave., DeWitt Center, Auburn, CA 95603. The cost is \$13 or \$15 mailed (includes tax and shipping). Please make checks payable to UC Regents and enclose with order.

UC researchers' study shows regional "branding" helps farmers survive

There's another kind of "branding" taking place in farming regions in California and across the country that is helping rural communities survive an increasingly global market. In addition to cattle brands, farmers and ranchers and rural communities are finding that "place-based" branding of agricultural products strengthens farm businesses and communities.

"We found that at least 12 ag marketing groups with regional brands are active in the state," said **Gail Feenstra**, food systems analyst for the Davis-based statewide UC Sustainable Agriculture Research and Education Program (UC SAREP).

Graduate researcher **Erin Derden-Little** conducted 25 interviews throughout the state with directors of regional ag marketing programs ranging from "PlacerGrown" and "Lake County Farmers Finest" in the north state, to "Buy Fresh, Buy Local" in the Central Coast and "San Diego Grown" in the south state.

"Their basic goal is to increase consumer awareness and consumption of locally grown products," said Derden-Little. "We know they've raised the visibility of farm businesses."

Feenstra initiated the project as part of a national effort to boost small- and mid-scale farms that find it is increasingly difficult for them to compete in highly consolidated commodity markets.

Derden-Little and Feenstra's report, *Regional Agricultural Marketing: A Review of Programs in California*, is available as a free download at sarep.ucdavis.edu/cdpp/foodsystems/MarketingReportFinal_5_10.pdf. The report was prepared as part of UC SAREP's continuing participation in the national research project NE1012, *Sustaining Local Food Systems in a Globalizing Environment: Forces, Responses, Impacts*.

Additionally, the project has helped Yolo County agricultural commissioner **Rick Landon** explore the possibility of initiating a regional marketing label through his office, according to Feenstra.



10 years: Lodi-Woodbridge Winegrape Commission's Biologically Integrated Farming System Program

By Cliff Ohmart, LWWC Research/IPM director

In 1995 the Lodi-Woodbridge Winegrape Commission (LWWC) was awarded one of two inaugural grants from the University of California's Sustainable Agriculture Research and Education Program's (UC SAREP) Biologically Integrated Farming Systems Program (BIFS). The three-year grants were intended to be "seed" money to establish programs that growers would continue into the future once the grant money ended. The winegrape growers of LWWC's BIFS program have done just that with 2006 being the eleventh field season of their BIFS program. This brief report, extracted from a larger report that can be found at www.lodiwine.com/ipmnewsletter1.shtml or sarep.ucdavis.edu/BIFS/LWWCreport, describes the first decade of the program.

LWWC is a grower commission formed in 1991 by a vote of the winegrape growers in California Crush District #11. It is funded by an assessment on the annual value of growers' winegrape crops. There are currently about 750 LWWC member growers farming over 90,000 acres of winegrapes, which comprises about 20 percent of the winegrape production in California.

Lodi winegrape growers set three goals when LWWC was formed:

1. Differentiate Lodi in the marketplace as a producer of premium winegrapes and wine.
2. Fund research on local viticulture issues assisting Lodi growers to produce higher quality winegrapes.
3. Create and implement an area-wide integrated pest management (IPM) program.

In 1995, LWWC transitioned their IPM program into a sustainable winegrowing program and applied for a BIFS grant from



Cliff Ohmart has led the Lodi-Woodbridge Winegrape Commission BIFS program since 1995. (photo by Jeri Ohmart)

UC SAREP to help accomplish this goal. The strength of the BIFS model of extension arises from the fact that it is grower-driven. Growers are the foundation of the program and their experience on the farm is recognized as a valuable addition to the body of knowledge that moves agriculture forward.

The focus of LWWC's BIFS program was to encourage growers and pest control advisers (PCAs) to use sustainable farming practices that have already been demonstrated to be effective. A 10-person management team of growers, PCAs, LWWC staff, university scientists, and a UC Cooperative Extension farm advisor was established to oversee the project during the BIFS grant. LWWC's Research Committee, made up of growers, PCAs and UC Cooperative Extension farm advisors, assumed this role at the conclusion of the UC SAREP BIFS grant in 1998.

LWWC's BIFS program consists of three

components: grower outreach, field implementation and evaluation. The initial goal of the **grower outreach component** was to introduce growers and PCAs to the concepts of biologically integrated farming and how to implement specific practices in their vineyards. It was directed at the entire LWWC membership and consisted of:

- Monthly breakfast meetings
- Twice yearly half-day research seminars
- Field days where sustainable farming practices are demonstrated in BIFS vineyards
- Bimonthly newsletter featuring sustainable practices and profiles of BIFS growers
- A Web site outlining the sustainable winegrowing program (lodiwine.com)

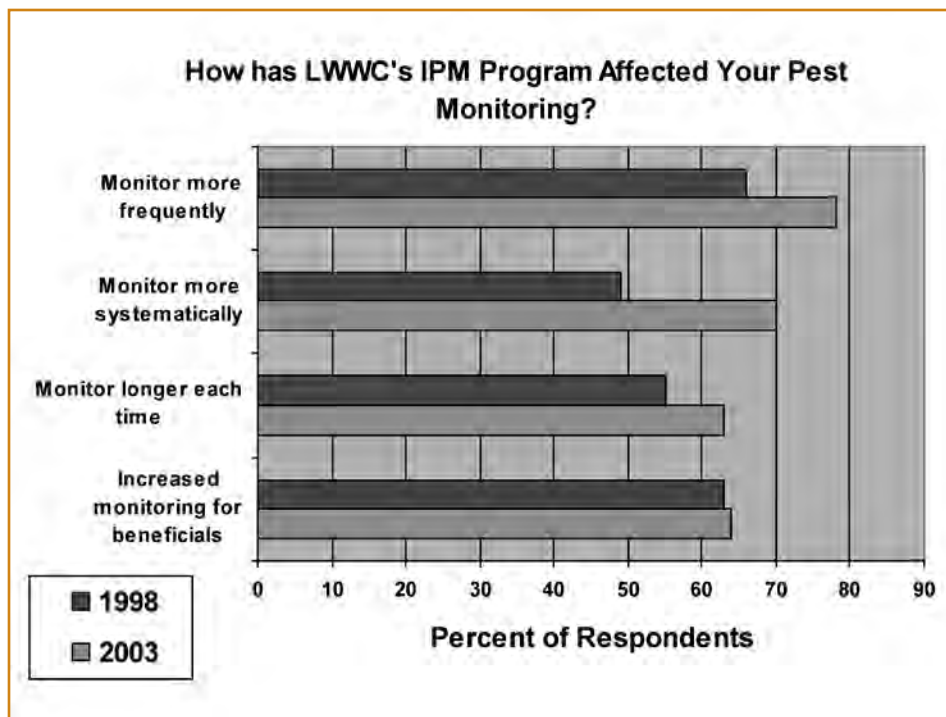
- Neighborhood grower meetings that were small workshops at growers' houses

Following the initial grower outreach, the **field implementation component** was established. LWWC growers were asked to join the program by designating one or more of their vineyards as BIFS vineyards. By the beginning of the second year, 45 growers had enrolled in the BIFS program. The PCAs working with these growers were also included in the program.

The efficacy of BIFS practices was demonstrated in 70 vineyards encompassing 2,300 acres. Growers and LWWC staff recorded all the practices carried out in these vineyards including weekly pest monitoring, pesticide use, all vineyard floor management and viticultural practices, and yields. A state-of-the-art relational database system and field data collection system were created to capture, enter and summarize all the data. Annual meetings with BIFS growers and PCAs were held to share data summaries from the past year and discuss their implications on vineyard practices.

The **program evaluation component** consists of two parts. One is the annual data summaries from the BIFS database; the other was the two district wide grower surveys carried out in 1998 and in 2003 with a response rate of 47 percent and 44 percent, respectively. The surveys evaluated the quality of LWWC's grower outreach activities and how the BIFS program has affected growers' winegrowing practices as well as their attitudes and perceptions of IPM.

As a result of the project's emphasis on the importance of regular, systematic monitoring of pest populations as the basis for making sustainable pest management decisions, many LWWC growers increased their monitoring efforts. In both of LWWC's grower surveys, respondents were asked how LWWC's program affected their monitoring frequency, thoroughness, and monitoring for pests and beneficials. The graph below shows that the program impacted each aspect of pest monitoring by 1998, and was even greater by 2003. These results provide evidence that the BIFS model of working with a core group of



growers and disseminating the results to the greater grower population is very effective.

The BIFS program also succeeded in demonstrating to growers and PCAs the database software tools that are available for farm data collection and management.¹ At annual meetings, BIFS growers and their PCAs were able to consider the importance of using quantitative data to make sustainable farming decisions.

For example, based on data summaries from BIFS vineyards, growers were able to compare leafhopper nymph (a common grape pest) counts per leaf on BIFS vineyards that were sprayed with pesticides to those not sprayed. It was readily apparent that the treatment threshold for leafhoppers was low for some growers but much higher for others, yet none suffered economic losses due to leafhopper damage. Although there are several things that enter into a grower's decision whether or not to treat a pest population, one important element of the decision process is the perception of risk. If the risk is perceived to be high, then a treatment is made; if it is low, then nothing is done. The comparison clearly indicated that the perception of risk varied among growers and PCAs and demonstrated the value of using quantitative data to compare

the actions taken by different growers. These comparisons help BIFS growers and PCAs separate perceived risk from real risk so they can make better pest management decisions.

As a result of the ongoing demonstration on BIFS vineyards and the accompanying grower outreach over the last decade, LWWC growers have reduced the environmental impact of their pesticide use to be roughly equivalent to that of certified organic vineyards. This outcome is supported by results of LWWC's Pesticide Environmental Assessment System (PEAS), which models environmental impacts of pesticides, either synthetic or organic, in vineyards. (For more information on the LWWC PEAS model visit lodiwine.com/lodirules_peas1.shtml.)

A more complete description of LWWC's BIFS project and the broad range of accomplishments and tangible outcomes are described in the full report at www.lodiwine.com/ipmnewsletter1.shtml or sarep.ucdavis.edu/BIFS/LWWCreport.

¹ The LWWC BIFS program influenced the development of farm management database software by two companies who sell software designed for winegrape growers: SureHarvest (www.sureharvest.com) and Premiere Viticulture (premierevit.com).

Making a precarious perch more secure: Central Valley farm ponds for native fish conservation

by Robert L. Bugg, UC SAREP and Peter B. Moyle, UC Davis Wildlife, Fish and Conservation Biology

The Sacramento perch is the only member of the sunfish family (Centrarchidae) that is native to California. For thousands of years it has inhabited rivers, lakes, and sloughs in the Central Valley, as well as Clear Lake and the Salinas and Pajaro rivers, serving as a major food for Native Americans. As an adult, the Sacramento perch feeds mainly on small fish, but also takes insects, including mosquito larvae and pupae. It is being used in Contra Costa County as a mosquito control tool, an alternative to the non-native mosquitofish.

The family Centrarchidae comprises bass and sunfish, fish that many of us associate with farm ponds. In fact, except for Sacramento perch, all of these species, such as bluegill sunfish, green sunfish, and largemouth bass, are from the eastern U.S. and have become established throughout around much of California. These introductions have exposed the Sacramento perch to unaccustomed competition and predation, which have eliminated it from its native range. However, Sacramento perch tolerates extremes of salinity and alkalinity better than many of its eastern competitors and it has done well when transplanted outside its native range to alkaline reservoirs and lakes in Nevada, Utah, and eastern California.

The Sacramento perch may soon acquire yet another set of habitats: constructed farm ponds and stock ponds in and around the Central Valley. **Peter Moyle** (one of the authors), a professor of Wildlife, Fisheries and Conservation Biology, has been working with his colleague **Joseph Cech** and animal science professor **Bernie May** to learn the secrets of the biology of this poorly understood fish. One of the goals is to find ways to re-establish them in their native range; farm ponds appear to be a good place to start. The Sacramento perch not only is well adapted to Central Valley conditions and is considered a great game fish, but it is also one of the best eating fishes in the state.

Although farm ponds are common fea-

tures in many rural landscapes, there have been few ecological studies and no systematic assessment of the scope of this resource in California. Farm ponds often contain non-native fishes, but are also an important habitat for native amphibians (such as California tiger salamander, California red-legged frog, and northern red-legged frog) and birds.

A key collaborator in the research is **Chris Miller** of the Contra Costa Mosquito and Vector Control District in Concord, who has a keen interest in restoring Sacramento perch, in part because it is a native game fish that can also control mosquitoes.

“Most of the mosquito control districts distribute mosquitofish,” he said. “Mosquitofish, which are non-native, are often—and with some justice—criticized as being deleterious to native fish and amphibians. Use of Sacramento perch could help us respond, in part, to those criticisms. Use of the native three-spined stickleback is an option in coastal Humboldt County and other places with cool climates, but we don’t think this fish will hold up in the warm, stagnant water we have in our district. Sacramento perch can tolerate those conditions.”

Miller said that not much information is yet available on the biology of Sacramento perch.

“So, we collected and bred them, and did some preliminary studies in aquariums, which confirmed that they do indeed eat mosquito larvae, beginning about 15 days after the fish hatch, and actually appear to prefer them over *Daphnia* [a small aquatic crustacean],” he said.

Miller and colleagues now produce 1,000-3,000 immature perch per year plus several hundred adults. He noted that there are drawbacks in rearing the fish, including cannibalism, a problem that is expected for a fish-eating perch. He is working on a size-grading technique involving selective meshes, to reduce the incidence of cannibalism.



Sacramento perch (photo by Peter Moyle)

Moyle and colleagues have several grant proposals pending that would support further work on the Sacramento perch, including the distribution of hatchery-reared fingerlings to farmers in Yolo County, with follow-up monitoring to evaluate colonization and survival. Ponds will need to be drained occasionally to reduce competition by introduced fish.

This project could serve as a prototype for restoring other native animals on California ranches and farms, and in suburban areas.

Yolo County Resource Conservation District, in collaboration with Moyle and others, has just obtained a grant for \$2,257,978 from CalFed Ecosystem Restoration, for a project entitled “Yolo-Solano Conservation Partnership for Habitat on Working Lands” (<http://www.delta.dfg.ca.gov/erp/docs/2005grants/88.pdf>). As part of this project, Moyle is seeking farmer-collaborators with ponds in Yolo and Solano counties, for establishing and managing Sacramento perch. Contact Moyle at (530) 752-6355 or pmmoyle@ucdavis.edu.

Additional Reading

- Goodsell, J.A. and L.B. Kats. 1999. Effect of introduced mosquitofish on pacific tree frogs and the role of alternative prey. *Conservation Biology* 13:921-924.
- Lawler, S.P., Dritz D., T. Strange, M. Holyoak. 1999. Effects of introduced mosquitofish and bullfrogs on the threatened California red-legged frog. *Conservation Biology* 13:613-622.
- Moyle, P.B. 2002 *Inland Fishes of California*, University of California Press, Berkeley.

New UC cover crop, nitrogen fertilizer publications aimed at walnut growers

Two new University of California publications that detail key farming practices for walnut growers have been produced with funding from the California Department of Food and Agriculture's "Buy California" Initiative and the USDA.

"We're pleased that California growers have a new source of information and direction about cover crops and the best use of nitrogen fertilizer," said **Joe Grant**, UC Cooperative Extension farm advisor in San Joaquin County.

The publications are outreach products from the "Buy California" and USDA-funded UC project "Increasing the Adoption of Biologically Integrated Farming Systems in California Specialty Crops: Farmer-to-Farmer Outreach of Environmentally Sound and Economically Viable Practices."

The project, which began in 2003, built on the successes of the UC state-wide Sustainable Agriculture Research and Education Program's (SAREP)

Biologically Integrated Farming Systems (BIFS) program, according to **Bev Ransom**, SAREP BIFS coordinator.

"The authors worked with an experienced group of walnut farmers who are familiar with biologically integrated farming systems," she said. "They were able to produce two very 'user-friendly' documents that deal with the dynamics of cover crops and nitrogen fertilization."

The two new publications, which are available from UC ANR's Communication Services, are:

Cover Crops for Walnut Orchards, by **Joseph Grant, Kathy Kelley Anderson, Terry Prichard, Janine Hasey, Robert L. Bugg, Fred Thomas, Tom Johnson**. The publication explains cover crops, the noncash crops grown to improve soil quality that add organic matter and nitrogen. It presents the benefits of cover cropping as well as challenges unique to walnut orchards, and outlines a step-by-step process from choosing cover crops to planting and managing them. 19 pages. ANR publication 21627, \$7.00. Order

online at <http://anrcatalog.ucdavis.edu/InOrder/Shop/ItemDetails.asp?ItemNo=21627>

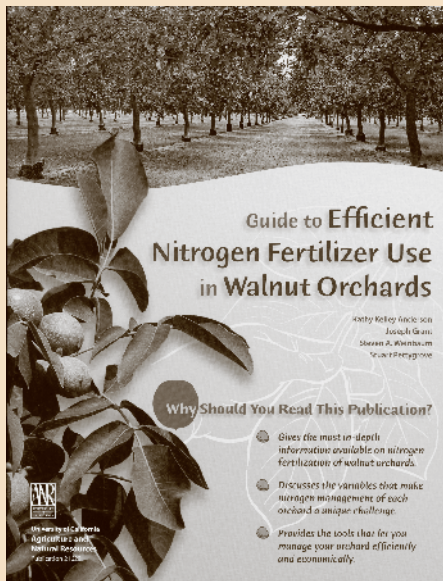
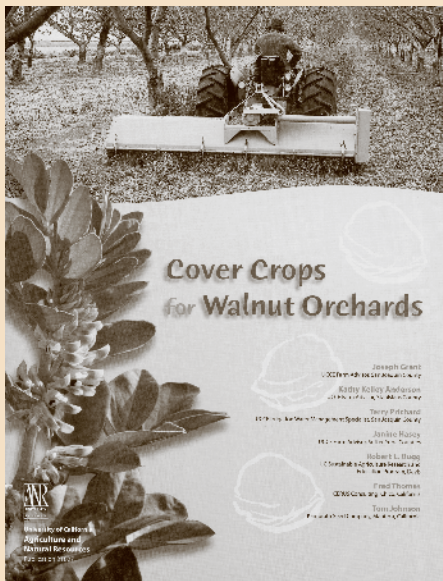
Guide to Efficient Nitrogen Fertilizer Use in Walnut Orchards, by **Kathy Kelley Anderson, Joseph Grant, Steven A. Weinbaum** and **Stuart Pettygrove**. This publication describes concepts and tools growers can use to maximize nitrogen use efficiency by matching it to tree demand, thereby avoiding unnecessary losses. Chapters cover concepts of fertilization, nitrogen budgeting, choosing fertilizers, and fertilizing young trees. Also included is a worksheet for nitrogen budgeting. 19 pages. ANR publication 21623, \$10.00. Order online at <http://anrcatalog.ucdavis.edu/InOrder/Shop/ItemDetails.asp?ItemNo=21623>

"Efficient use of nitrogen fertilizers in walnut orchards can affect both productivity and profits, while reducing contamination of ground and surface waters," said **Kathy Kelley Anderson**, UC Cooperative Extension farm advisor in Stanislaus County.

She noted that farmers have increased the use of cover crops in the last several years.

"Although the main reason to plant a cover crop is to improve soil quality, cover crops can also enhance water infiltration, reduce dust, and prevent runoff of water and pesticides," she said.

Both publications can be ordered by calling (800) 994-8849 or by logging onto <http://anrcatalog.ucdavis.edu>. Shipping and applicable tax are added to the cost of each order.



SARE UPDATES

SARE Patrick Madden award winners

The USDA Sustainable Agriculture Research and Education (SARE) program has announced the 2006 Patrick Madden Award winners, a biannual prize for producers who are profitable and value the environment and their communities. The award honors exemplary farmers throughout the U.S. and was presented Aug. 16 by the USDA's Sustainable Agriculture Research and Education (SARE) program at its national conference in Wisconsin.

The Western Region winner is **Paul Muller**, partner in Full Belly Farm in the Capay Valley, northeast of Woodland. Muller describes his 250-acre organic farm, as "a wonderful adventure." Full Belly sells nearly 80 crops including vegetables, fruits, nuts, and flowers as well as animal products and employs 40 workers.

Muller's "different model" of agriculture focuses on diversified products and varied, lucrative marketing outlets, including restaurants, farmers markets and its 800-member community supported agriculture (CSA) project.

Muller regularly tests new crops and growing methods, and works to achieve higher quality and better flavor. The farm's cropping rotations result in year-round production and year-round sales so the farm can employ steady workers and enjoy continuous cash flow. Full Belly, which became fully organic in the 1980s, also nurtures beneficial insects and wildlife by planting hedgerows of native plants and preserving the riparian

area along a neighboring creek. A 17-kilowatt photovoltaic solar system was installed last spring, which will pay for itself in eight years and provide a good rate of return for 30 years; Muller and partners are also experimenting



Paul Muller, Full Belly Farm partner

with biodiesel filtered and refined from cooking oil from Bay Area restaurants.

Muller is joined by other regional Madden Award winners, including:

- **Alex and Betsy Hitt**, vegetable growers in Graham, N.C.
- **Edwin and Marion Fry**, organic crop and dairy producers in Chestertown, Md.
- **Rex Spray**, an organic crop and beef producer in Mt. Vernon, Ohio.

Learn more about Muller and the other Madden Award Winners at SARE's Web site sare.org/coreinfo/madden2006.htm

Western SARE announces new research and education projects

California receives 10 grants for \$320,162

The Western Region USDA SARE program recently announced its 2006 grants. California researchers, educators and graduate students have been awarded 10 grants totaling \$320,162 to help sustain agriculture, the environment and rural communities.

Two grants will seek to contain a noxious weed called medusahead, which has invaded more than five million acres in Northern California. Other grants will address reduced tillage practices in forage crops, fungus control in organic pistachios, cover crop effects on nitrogen cycling and the effects of hedgerows and other natural habitat on controlling crop-damaging insects.

New to the program this year are grants to graduate students studying various aspects of agricultural production. Western SARE awarded six Graduate Fellow grants to students at Davis, Berkeley, Sonoma and Santa Cruz.

Since the SARE program was begun in 1988, Western SARE has awarded 112 grants worth \$7.26 million for projects in California.

This year's grant recipients are:

- **Morgan Doran**, Fairfield, mpdoran@ucdavis.edu, \$3,479, Professional + Producer grant, Using molasses as an attractant for concentrating grazing on medusahead.
- **Jeff Mitchell**, Parlier, mitchell@uckac.edu, \$9,400, Professional + Producer grant, Conservation tillage forage production in California's San Joaquin Valley.
- **Emilio Laca**, Davis, ealaca@ucdavis.edu, \$138,539, Research and Education

grant, Strategies to control medusahead in California.

- **Dan Parfitt**, Davis, deparfitt@ucdavis.edu, \$110,286, Research and Education grant, Alternaria control using biocontrol yeast in organic pistachio production systems.

Graduate Fellow Grants:

- **Angela Yin Yee Kong**, Davis, aykong@ucdavis.edu, \$9,995, Linking carbon and nitrogen cycling to microbial community function in cover crop systems.
- **Rebecca Chaplin**, Berkeley, rchaplin@nature.berkeley.edu, \$9,650, Pest control services from natural habitat.
- **Tara Pisani Gareau**, Santa Cruz, tarapg@ucsc.edu, \$10,000, Investigating the effect of hedgerows to enhance natural biological cycles.
- **Katie Monsen**, Santa Cruz, kmonsens@ucsc.edu, \$10,000, Understanding nitrogen fixation by legume cover crops in organic vegetable systems.
- **Joan Schwan**, Sebastopol, schwanjo@sonoma.edu, \$8,813, Sheep grazing as a tool for vernal pool stewardship.

- **Dominic Reisig**, Davis, ddreisig@ucdavis.edu, \$10,000, Developing a management plan for reducing thrips-induced damage on timothy hay.

USDA's SARE program helps advance farming systems that are profitable, environmentally sound and benefit communities through a national research and education grants program. The program, part of USDA's Cooperative State Research, Education and Extension Service, funds projects and conducts outreach designed to improve agricultural systems. Western Region SARE project summaries and grant announcements are available at wsare.usu.edu.

New SARE funding available

USDA recently announced that the Western region will receive \$3.65 million to fund grants for the coming fiscal year. 2007 grant applications are available on the Western SARE Web site.

Funding is available in five main categories:

- Farmer/Rancher grants provide up to \$15,000 (an increase from \$10,000 in 2005) for an individual producer and \$30,000 (an increase from \$20,000 in

2005) for three or more producers to conduct on-farm research.

- Professional + Producer grants are available to ag professionals working with producers; the limits are \$15,000 with one producer and \$30,000 with three or more producers.
- Research and Education grants, which range between \$20,000 and \$200,000, are available to agricultural researchers, typically at land grant universities, for applied research involving agricultural producers.
- Professional Development Program grants, ranging between \$30,000 and \$100,000 depending on length of funding and geographic focus, are designed to help ag-support professionals train other professional in sustainable agriculture concepts.
- Graduate Fellow grants, worth up to \$20,000 (an increase from \$10,000 in 2005), can be used to assist students in their graduate research projects.

For more information call Western SARE's host institution, Utah State University, at (435) 797-2257 or email wsare@ext.usu.edu.

Former SAREP associate director joins Sacramento CE

Janet "Jenny" C. Broome, former SAREP associate director, has taken the position of academic coordinator in Sacramento County. At her new position she will work with Sacramento, Yolo and Solano county farm advisors and Master Gardener staff to provide plant disease diagnosis and management advice as well as develop a cooperative research and education program for various

crops in the southern Sacramento Valley. She is interested in working with campus academics on cooperative projects in plant pathology and plant health management relevant to the region, and in helping organic farmers develop plant disease management options. She can be reached at jcbroome@ucdavis.edu, (916) 875-6913, (530) 681-0216, 4145 Branch Center Road, Sacramento, 95827.

CALENDAR

* SAREP WEB CALENDAR AND ONLINE COURSE

SAREP offers a regularly updated sustainable agriculture calendar on our World Wide Web site at: sarep.ucdavis.edu (click "Calendar" on top menu bar). Please feel free to add sustainable agriculture events. In addition, we offer an online course for pest control advisors and others titled *Ecological Pest Management*. Up to 11 CE credits for California PCAs. See sarep.ucdavis.edu/courses/

* NATIONAL/INTERNATIONAL CALENDAR

The National Agricultural Library maintains a calendar as part of AgNIC at www.agnic.org. It links to more than 1,200 major national and international agricultural conferences.

NOVEMBER

6—7 *ANR Pest Management Coordinating Conference*, Embassy Suites, Sacramento Riverfront Promenade. Information: <http://groups.ucanr.org/pm/>

10—12 *Raising Vegetables & Civic Values : CSA in the 21st Century*, Kettunen Center, Tustin, Michigan. Workshops for experienced & new CSA farmers, small farm advocates, community food/health advocates, educators/extension personnel. Speakers: journalist Steven McFadden (Farms of Tomorrow Revisited), farmer/poet/author Scott Chaskey (Quail Hill Farm, This Common Ground). Intensive 1/2 day mini-school for new/prospective CSA growers. Information: csafarms.org/csafarms4056869.asp

13—15 *Farming on the Edge*, American Farmland Trust & Delaware Dept. of Agriculture. Clayton Hall Conference Center, University of Delaware, Newark. Share information/ideas, network, find allies, form partnerships for a

balance among sustainable agriculture, farmland protection & environmental quality. Information: <http://farmland.org/news/events/2006conference/default.asp>

14 *Napa Valley Viticultural Fair*, presented by Napa Valley Grapegrowers. Napa Valley Exposition Fairgrounds, 575 Third Street, Napa. One-day trade show/educational forum for the winegrape industry. Seminars, 120-booth trade show; PCA credits available. Debut of "Organic Alley," highlighting companies offering organic products. \$10. 8 a.m. - 4 p.m. Information: napa-valleyvittfair.com

27—30 *BBI Biofuels: Workshop & Trade Show*, Western Region Event. Grand Manchester Hyatt, San Diego. Focus on development of commercial-scale ethanol & biodiesel production. Information targets regional challenges/opportunities for biofuels industry development. Information: biofuelsworkshop.com

JANUARY

24—27 *Eco-Farm 2007*, Ecological Farming Conference. Asilomar Conference Grounds, Pacific Grove, CA. Eco-Farm features prominent keynote speakers, 50+ workshops on ag production, marketing, research, issues. Unique opportunity to exchange information with people from around the world, renew spirits. Information: eco-farm.org/efc/aboutefc.html

MARCH

4—7 *California Farm Conference*, Monterey Bay Beach Resort, Monterey. State's premier gathering of small farmers, supporters. On-farm tours, workshops, peer networking. Information: californiafarmconference.com

A regularly updated list of funding sources is available online at

sarep.ucdavis.edu/grants/request.htm

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. SUSTAINABLE AGRICULTURE is published three times yearly by SAREP staff from its UC Davis offices, with assistance from ReproGraphics, UC Davis. Mailing address is: UC Sustainable Agriculture Research & Education Program, University of California, One Shields Ave., Davis, CA 95616-8716.

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