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***From the Director***

# BIFS Workgroup Begins

The University of California Division of Agriculture and Natural Resources (ANR) strategic plan acknowledges the important role for ANR workgroups to help carry out the Land Grant mission of establishing a vigorous research/extension effort to facilitate technical and information exchange in a new learning environment.

Workgroups, composed of departmental faculty, specialists, advisors, agricultural professionals, public agency representatives, producers and other clients, will enhance the ability of the Division to respond in a unified manner to critical issues. I am pleased to report that the ANR Program Council has funded our Biologically Integrated Farming Systems (BIFS) Workgroup proposal. I will serve as chair of the new workgroup. As a statewide program charged with addressing critical problems of agricultural sustainability in California, SAREP's leadership of the BIFS Workgroup will ensure that ANR resources are focused on this cross-commodity effort. By the time this newsletter is distributed, the BIFS Workgroup will have had its inaugural meeting in Modesto. The workgroup meeting will include project updates and formal presentations on: evaluating the adoption of alternative practices and other social science research considerations, use of the state's Pesticide Use Report system to evaluate pesticide use trends, BIFS project data management systems, side-by-side plot comparison methods, plans for a research symposium, future projects and funding initiatives, and reciprocal site visits. If you are interested in staying informed about BIFS Workgroup activities, please contact me or our new BIFS program coordinator (see below). For more information about BIFS, see past issues of our newsletter or visit our program Web site (www.sarep.ucdavis.edu) for reports of completed projects and other news.

The increased interest in biologically integrated farming systems has brought a proliferation of related extension and research projects in California supported by other grants programs managed by state or federal agencies and non-profit organizations and foundations. In this exciting partnership model environment, I would like to invite all statewide researchers, extension professionals and public and private stakeholders to the workgroup meetings and activities. The workgroup will provide an excellent opportunity for sharing impact assessment data and tools necessary to a successful project.

I would also like to take this opportunity to welcome **Max Stevenson**, SAREP's new BIFS coordinator. He comes to the program with a 1998 doctorate in plant biology from UC Davis. He previously worked for the Community Alliance with Family Farmer's Biologically Integrated Orchard Systems (BIOS) program evaluating the multi-year performance of biologically integrated almond and walnut orchard systems. His new duties at SAREP include making site visits and attending management team meetings

of SAREP-funded BIFS projects, expansion of the BIFS section of the SAREP Web site and coordination and planning of the BIFS Workgroup agendas and activities. I am pleased to add someone of his experience and academic background to our program staff. —*Sean L. Swezey, director, University of California Sustainable Agriculture Research and Education Program.*

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# Biological Apple Farming Reduces Risks in Urban Areas

*by Lyra Halprin, SAREP*

Rapid urbanization around Contra Costa County apple and pear orchards and resulting concerns about the pesticides used in crop production has inspired a farm advisor to organize a project to help growers reduce pesticide use.

“Apples are the highest value agricultural crop in Contra Costa County,” says **Janet Caprile**, UC Cooperative Extension farm advisor. “Most are grown in the eastern portion of the county surrounding the cities of Brentwood, Oakley and Byron, which are among the fastest growing cities in the state.”

Caprile is the principal investigator of a newly funded Biologically Integrated Farming Systems (BIFS) project, which focuses on reducing the use of controversial, broad-spectrum insecticides in pome fruits (apples and pears). BIFS is administered by SAREP. A key component of the newest BIFS project is the use of mating disruption (MD) to reduce the numbers of codling moth, the most critical pest in apple and pear production. If left unchecked, codling moths larvae, the proverbial “worm in the apple,” can cause more than 80 percent fruit loss. Typically, control strategies for codling moths rely on organophosphate sprays , which can lead to outbreaks of secondary pests (mites, leafhoppers, aphids).

“An alternative approach to codling moth management is central to the transition away from the disruptive pesticide treadmill,” Caprile says.

During the first year of the three-year BIFS project, Caprile and a team of growers, pest control advisors and UC researchers will be using supplemental codling moth sprays in addition to MD to reduce codling moth populations to very low levels.

“As pest pressure decreases, the supplemental sprays will shift from the more toxic and broad spectrum organophosphates to less disruptive, low toxicity but less effective materials,” she says. “Once the organophosphates have been eliminated from the system, releases of recently imported codling moth parasites will be made to supplement mating disruption. As the codling moth pressure continues to decrease, the MD per acre can be reduced to lower pest management costs.”

She notes that as the organophosphate sprays for codling moth are reduced, many of the secondary pests have the potential to be adequately controlled by fertility and water management, and biological methods.

Caprile says the primary barrier to adoption of MD in California previously has been cost. To offset the increased cost of a MD program, this BIFS project will offer a 50 percent cost share for the mating disruption product to participating growers for three years. This would make California grower

costs equal to those of Northwest growers, who have shorter seasons and lower pest pressure.

The apple-pear BIFS project will receive a total of $140,000 for the next three years, according to **Max Stevenson**, SAREP BIFS coordinator.

“I grew up in Contra Costa County and the rate of urbanization is amazing," Stevenson notes. “If agriculture is to continue in the county, its benefits, such as open space and local food production, will have to outweigh the downsides such as pesticide use near homes. Reduced pesticide use in the apple BIFS project goes a long way in that regard."

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# New SAREP PAC/TAC Members

*By Lyra Halprin, SAREP*

UC SAREP was created almost 14 years ago, the product of legislation carried by Senator **Nicholas Petris** of Oakland in response to farmer, consumer and researcher concerns that California farming practices be more ecologically sound, economically profitable and socially responsible. It was September 26, 1986 that then-Governor **George Deukmejian** signed Senate Bill 872, the Sustainable Agriculture Research and Education Act of 1986, into law. The Act requested the Regents of the University of California to establish the Sustainable Agriculture Research and Education Program (SAREP). The legislation charged SAREP with administering a competitive research grants program for sustainable agricultural practices and public policies, developing and disseminating new and existing information on sustainable practices, and coordinating long-term farmland research.

The program found a home at UC Davis and the first program and technical advisory committees were selected; they sent out SAREP's first Request for Proposals for grants. After a national search, **Bill Liebhardt** was selected SAREP director in March 1987; soon after his arrival the first grants were awarded to eight projects and the program was on its way. Liebhardt stepped down in 1998 to return to his work as a sustainable agriculture specialist in the UC Davis agronomy and range science department; **Robert Reginato** served as interim director until January 1999 when **Sean L. Swezey** was named SAREP director.

"SAREP has held closely to its mandate to support research and extension efforts relevant to the state's farmers and ranchers," said Swezey.

From 1987 to 1999, SAREP funded 100 projects related to crop or livestock production, for a total of $6 million. Additionally, during that time SAREP has funded 39 projects for more than $720,000 promoting community economic development, direct marketing strategies, community food security, public policy analyses and the development of community food system projects.

SAREP's enabling legislation requires it to have both program and technical advisory committees to advise the university on program goals and make recommendations on the award of competitive grants. The Program Advisory Committee (PAC) includes individuals actively involved in agricultural production, as well as representatives from government, public organizations, and institutions of higher education. The Technical Advisory Committee (TAC) is made up of faculty and staff from universities and colleges throughout California with knowledge and experience related to sustainable agriculture, and makes recommendations about the scientific merit of grant applications. Each PAC or TAC member serves for three years. New members appointed in 1999 are listed here. [A separate, 13-member Biologically Integrated Farming Systems (BIFS) advisory committee makes

recommendations about BIFS grants.]

**Program Advisory Committee**

**TESS DUNHAM** is a lobbyist in the California Farm Bureau's Federal Governmental Affairs Division. As the director of environmental protection, Tess represents the Farm Bureau and its members before the state legislature on endangered species, pesticides, water quality and other environmental issues. She has also served as an attorney for Farm Bureau's legal services division specializing in land use, natural resource and environmental law. Previously Tess worked at the California Resources Agency, the California Department of Conservation, and in the office of former Governor Pete Wilson. Tess grew up on a Northern California farm where her family raised rice and sheep and she was active in 4-H and Future Farmers of America.

**MARK LIPSON** is the policy program director for the Organic Farming Research Foundation in Santa Cruz. His work there since 1995 has been focused on federal agricultural research policy and promoting institutional support for organic farming research and education. He authored the 1997 publication *Searching for the "O-Word,"* which documented and analyzed the lack of federal support for organic research. He is also a partner in the Molino Creek Farming Collective, an organic vegetable (tomatoes, peas, squashes, peppers, salad greens) operation near Davenport in Santa Cruz County, and has been part of that farm business and community since 1983. Mark worked for California Certified Organic Farmers from 1985-92, and was the primary "midwife" of the California Organic Foods Act of 1990. He is particularly interested in organic agriculture, small farm viability, biotechnology and agricultural research policy. He and his wife Marcy and stepson David live in a photovoltaic-powered geodesic dome on Molino Creek Farm.

**RANDII MacNEAR** has been the manager of the Davis Farmers Market for 19 years. The nationally recognized market, one of the largest certified farmers' markets in California, has been featured in *Sunset Magazine*, *Country America Magazine*, and in several cookbooks. The past president of the Davis Chamber of Commerce and a member of several Davis Downtown Business Association committees, Randii has been statewide coordinator of the Certified Farmers' Market component of the California Department of Health Services Children's 5-A-Day Campaign, the statewide coordinator and co-founder of the California Federation of Certified Farmers' Markets, a member of the statewide UC Small Farm Center Advisory Group, a member of the USDA National Forum on Farmers' Markets and the WIC Roundtable Task Force. She was also the project director and facilitator for the USDA-funded California State Certified Farmers' Market Web site project.

**SCOTT PAULSEN** is the Yolo County Agricultural Commissioner/Director of Weights and Measures. He previously held that position in Amador County. A past board member of the California Agricultural Commissioners and Sealers Association, he is chair of the organization's Biological Control/IPM Committee. He is past president of the Sacramento Valley Agricultural Commissioners and Sealers Association. He is especially interested in ag/urban interface issues and educating students of all ages about sustainable agriculture practices and the importance of an integrated pest management approach to control pests.

**FRANK TAMBORELLO** works with the Los Angeles Coalition to End Hunger and Homelessness. Previously, he was active in Houston fighting utility rate hikes with Texans United. After a stint in Angola with a team developing a school for street children who had lost their parents to that nation's civil war, he returned to Houston to work with the Association of Community Organizations for Reform Now on low-income housing issues. In Los Angeles he has worked on food access issues, doing outreach for the school breakfast and summer food programs and organizing welfare participants to speak out on legislation affecting them. He is interested in fostering more collaboration between anti-hunger and sustainable agriculture groups and increasing access to fresh nutritious food for the thousands of homeless individuals in Los Angeles' "Central City East" section.

**DIEGO VASQUEZ** is education program coordinator at the Rural Development Center in Salinas. He manages the Center's overall education program, including the three-year training program for small farmers. Born in Columbia where his family raised mixed vegetables, fruit, and coffee on a small farm, Diego received a degree in development studies at UC Berkeley where he did experiments in winegrapes for Miguel Altieri in the Division of Biological Control. He is particularly interested in efforts to make small farming viable.

**Technical Advisory Committee**

**TED BRADSHAW** is professor of community development in the human and community development department at UC Davis. Before coming to Davis, he spent almost 20 years at UC Berkeley doing research on the development of advanced industrial society, rural development, demographic trends, economic development and the social impact of technological change in California's Central Valley and forests. A sociologist by training, he teaches community development and local economic development. His current research focuses on programs to increase financing to small businesses and the potential for policy to stimulate production of very energy efficient housing in California. A co-founder of the Sustainable Communities Consortium, Ted is particularly interested in rural development and community organizations.

**CARLOS G. MURILLO** is dean of the Center for Science, Industry and Natural Resources at Shasta College in Redding, Shasta County, where he oversees educational programs and operations. Previously he was a dean and professor at Earth College in Costa Rica, an international college dedicated to sustainable tropical agriculture and entrepreneurship development education. At Earth College he taught agricultural marketing, natural resources, entrepreneurial projects, agricultural policy and was a member of the board of directors for commercial operations of the college, the research committee, and the continuing education program. A former board member of a cooperative development program, Carlos has worked with agricultural cooperatives for 18 years.

He worked as the Peace Corps associate director in Costa Rica, and for six years was a technical trainer and extensionist in many Latin American countries. Additionally, he founded consulting and ginger root export companies. Carlos is interested in sustainable food systems, and entrepreneurship and its role in sustainability and community development.

He is interested in educating young people about change and creativity, with a strong sense of ethics and responsibility to society and the environment.

**MICHAEL E. STANGHELLINI** holds the Cy Mouradick Chair in Desert Agriculture in the plant pathology department at UC Riverside. Prior to coming to UCR in 1997 he was a professor of plant pathology at the University of Arizona (1969-1997). His areas of expertise include ecology, epidemiology and control of soilborne root-infecting plant pathogens. He is particularly interested in biological control of soilborne plant pathogens and irrigation management to control root pathogens.

**CHERYL WILEN** is one of eight Area Integrated Pest Management advisors in the UC Statewide Integrated Pest Management Project. She is based in San Diego but works with growers, UC advisors, and pest control advisors in Los Angeles and Orange counties and has additional responsibilities in Riverside and San Bernardino counties. Cheryl focuses on integrated pest management for ornamental plant production as well as pest management for lands cape and turf sites. Her background is in horticulture and weed management systems and her particular interests are weed management and pesticide use reduction.

**Continuing PAC/TAC**

**Program Advisory Committee**: Bob Bornt, Frank Dawley, Debra Denton, Jeff Dlott, Tim O'Neill, An Peischel, Jim Rider and Beth von Gunten.

**Technical Advisory Committee**: Edie Allen [on leave], Ernst Biberstein, Holly Brown-Williams, Rachel Mabie, Doreen Stabinsky, Carolyn Stull, and Jo Ann Wheatley.

Biographies of continuing PAC/TAC members appeared in the Summer 1998 issue of *Sustainable Agriculture* (Vol. 10, No. 2).

**Retiring PAC/TAC**

The following advisory committee members have rotated off the PAC or TAC. **PAC**: Cynthia Cory, Leonard Diggs, James Liebman, Michael Straus and Brock Taylor. **TAC:** Steve Blank, Caroline Bledsoe, Robert Gottlieb, Blaine Hanson, Tim Hartz, Donald Klingborg, Craig Kolodge, Janet Savage, Rob Thayer and Joan Wright. UC SAREP is very appreciative of the work that advisory committee members do for the program.

## Bryte Stewart, Former PAC Member

It is with heavy hearts that we share the news of the death of **Bryte Stewart**, who served as a member of SAREP's public advisory committee from 1995-97. Stewart, 37, died Jan. 18 after a brief battle with cancer. He was a partner in a family farm and native grass seed business, Conservaseed, in Rio Vista. The operation produces winegrapes, pears, cherries, and California native grass seed. Stewart said he liked to include organic philosophies with conventional practices, and was interested in showing the public the positive aspects of the U.S. agricultural system. We'll remember him at our advisory committee meetings, leaning back in his chair, eventually letting us know in a kind but firm manner exactly what he thought. We truly appreciated the time

he spent reviewing proposals and coming to meetings. He will be missed. He is survived by his wife Jacqueline, three children, Sutton, 10, Laney, 8, and Bryte II, 6, his parents Jim and Jan, and his brother Scott, who will continue to operate the family business.

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# Youth Garden Project Teaches High School Students

*by Shawn Harrison, SAREP*

A small but growing youth gardening and plant nursery program has been developed in North Sacramento, with support from SAREP, UC Davis, Project YE'ES (Youth Economic Education Stability), Grant Union High School's Regional Opportunity Program (R.O.P.) and Voluntary Integration Program (V.I.P.), the Mutual Assistance Network of Del Paso Heights, and Sacramento Housing and Redevelopment Agency. SAREP is providing funding for the student outreach coordinator.

The program works with 40 high school students from two low-income neighborhoods, Del Paso Heights and Strawberry Manor, teaching them valuable skills in horticulture, urban agriculture, urban design and landscaping, and business management. Activities and training take place after school at the Fred Lawson Memorial Nursery and the Garden of Ethnic American Treasures on the Grant High School campus. This season will be an exciting time for the program, now in its third year, as the students expand the garden and begin to develop business ventures including a community supported agriculture project (CSA or subscription farm) at the garden site and a fall plant sale at the nursery. Students will also be conducting several community workshops on how to start your own garden in the spring and summer of 2000. For more information about the project, contact outreach coordinator **Shawn Harrison** at (916) 927-7694, ext. 204 or **Anne Marie Kennedy** at (530) 752-7956.

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***Project Update:***

# Sustainable Agricultural Education in the New Millennium

*by Mary Kimball, Yolo County Resource Conservation District*

The FARMS (Farming, Agriculture, and Resource Management for Sustainability) Program, created in 1993 by Winters farmers **Craig** and **Julie McNamara**, has enjoyed five and a half years of educating urban, suburban and rural youth about the connection between sustainable agriculture and science and natural resource conservation, and is looking forward to expanding the program throughout California. Thanks to SAREP funding for 1999-2000 ($17,500), the FARMS Program is creating a promotional video and instructional manual for groups interested in implementing the FARMS Program model in their own communities. [SAREP also granted $15,000 to the FARMS Program in 1996-97.]

Since 1993 students from Yolo, Sacramento and Marin counties have been part of the pilot program; in 1998 two new sites were added (Sonoma and Orange counties), while Butte County started a program in the fall of 1999. The FARMS program has been very successful in fostering collaboration among many players in California agriculture and education circles, and has connected more than 200 students and teachers to the issues surrounding sustainable agriculture. The addition of two new sites in 1998 and the resulting increase in interest in the program has shown that the FARMS model is transferable to other areas in California and the U.S.

**Unique Partnership**

The FARMS Program began in the Yolo-Sacramento region in 1993 as a unique partnership between Sierra Orchards (the McNamara family farm), The University of California, Davis, the Yolo County Resource Conservation District, and the California Foundation for Agriculture in the Classroom. The program has been expanded through two grants from the National Fish and Wildlife Foundation to include sites in Orange, Riverside, and Sonoma counties. Continuing the FARMS model, each of these sites blends agriculture, education, business, and environmental organizations to create a special partnership that supports and implements the FARMS Program. These organizations include: in Sonoma County, the Sotoyome Resource Conservation District (RCD), the Sonoma Farm Bureau, Santa Rosa Junior College, the Shone Farm, and Denner Ranches; in Orange County, the Orange County Farm Bureau, South Coast Resource Conservation and Development (RC&D), Natural Resources Conservation District (NRCS), Orange County Produce, and California Polytechnic University, Pomona. In Riverside, the South Coast RC&D, the NRCS, Cal Poly Pomona, and the Riverside-Corona RCD all work together to support their FARMS Program.

The FARMS Program provides an opportunity for 30 high school students at

each program site and their teachers to learn about the interrelationships between science, agriculture, and natural resource conservation through hands-on, real-life experiences. Through an application process, the 30 students are chosen from five different high schools in the region. The FARMS Program stresses diversity and includes rural, urban and suburban high schools. Approximately 60 percent of the students are considered urban/suburban, and 40 percent rural. The number of urban students participating in FARMS is increasing, however, which exposes many participants to farming in a way they have never experienced: up-close and personal.

"Most of our students are very removed from farming, yet it's a key economic component of California," says Davis High School science teacher **Linda Baker**, who attends many of the FARMS field days. "It's a chance for students to see what farming is all about, and to learn about different efforts to save and sustain the environment."

**Hands-on Learning**

The FARMS curriculum is unique, exposing participants to the needs of progressive farmers and ranchers who are working to meet consumer demands, enhance profitability, and live as stewards of the land. Over nine months, students attend monthly field days that provide this exposure through the use of hands-on, interactive workshops. The program centers on a lead farmer who opens his or her farming operation to the eyes, ears, and hands of FARMS participants. At Sierra Orchards in Winters, students participate in activities such as the walnut harvest, cover crop planting, soil testing, and owl-box building.

"One of our goals is to take students who may not have visited rural America much, and acquaint them with the fabric of family farming," says Craig McNamara. "Students spend a night with a farm family as part of the project."

In addition to exposure to the family farm way of life, FARMS presents agriculture as a career choice to students, and demonstrates the science behind agriculture in each workshop.

"We want to take high school students who may not have thought of the science of agriculture as a possible career, and expose them to what we are doing in sustainable agriculture," McNamara says. "These are practices that will sustain farming well into the next millennium."

"One of our objectives is to show students what it takes to operate a family farm today," he says.

He notes that one of the requirements of the program is to develop a research project dealing with sustainable agricultural practices. By having the students implement a research project, they can see that agriculture is an industry based on science and they are better able to understand the decisions that farmers must make on a daily basis.

To help FARMS students develop their projects, they are matched with mentors in the agricultural and environmental profession, such as NRCS scientists, UC Cooperative Extension farm advisors, university and college

faculty and graduate students, wildlife biologists, and watershed restoration specialists. These mentors teach students the basic scientific method: How to develop and test a hypothesis, how to collect and present data, and how to make conclusions and recommendations. Finally, the students learn the communication skills necessary to present their projects at a closing seminar.

"This is stuff I would never have learned in a classroom," says **Nate Reinking**, a past FARMS participant and a senior at Davis Senior High.

"I didn't have an interest in these subjects before I started (with the FARMS Program). They've turned out to be very interesting projects."

**Promotes Further Education**

The use of mentors meets two other FARMS objective: promoting post-secondary education, and introducing students to agricultural and environmental careers. The FARMS partnership deliberately includes a post-secondary institution; whether or not they attend UC Davis, Cal Poly Pomona, or Santa Rosa Junior College, FARMS students have been exposed to agriculture and are ready to build on a strong scientific foundation. Mentors help to break down the "ivory tower" perceptions that high school students have of colleges and universities. By working closely with a professor or professional in the agricultural and environmental sciences, students not only discover the variety of fulfilling careers choices available, but learn that college professors are people, too.

The success of the FARMS Program, first in the Yolo-Sacramento region, and now in three other areas of California, has led to a surge of interest from people and organizations interested in agricultural education around the state. The FARMS leaders are excited about the role that this program can play in educating California's youth about our farming heritage and our future in the next millennium. With 10 million K-12 students expected in California schools by the year 2010 and less than two percent of our population living on farms, the FARMS Program can play a major role in educating students about the importance of agriculture in each of our lives.

For more information about the FARMS Program, contact **Mary Kimball**, project coordinator, or **Katy Pye**, executive director, at the Yolo County Resource Conservation District, (530) 662-2037 ext. 3; topquail@yolorcd.ca.gov; mckimball@ucdavis.edu.

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***Staff Project Update:***

# California Winegrape Pest Profile, Pesticide Use, and Research Needs Under 1996 Food Quality Protection Act

*by Jenny Broome, SAREP*

*Special thanks to project consultant **Michael Costello** for his work on the project and the summary tables in particular, to **Artie Lawyer** for his early consulting work on the project, to **Karen Ross** of the California Association of Winegrape Growers for her leadership, to the U.S. Environmental Protection Agency (US-EPA) Region 9 Agricultural Initiative for funding, and to US-EPA project liaison **Paul A. Feder** for his coordination.*

This update is based on the Crop Pest Profile developed by the Food Quality Protection Act (FQPA) grape partnership and submitted to the USDA in December 1999 and presented in a summarized form at the Unified Wine and Grape Symposium in Sacramento January 25, 2000 in a session on "Vineyards and the Environment." In addition, some of this information was published in the January 2000 edition of *GrapeGrower* magazine.

In 1996 Congress passed the Food Quality Protection Act (FQPA). FQPA replaced the "zero tolerance" standard of the Delaney Clause for pesticide residues in processed food with the standard of "reasonable certainty of no harm" which applies to all pesticides used on all foods. Under the FQPA, the Environmental Protection Agency will review all pesticide registrations for food crops under a three tier "priority" system, equivalent to high (I), medium (II), and low (III) risk categories.

The FQPA Grape Partnership, made up of wine, raisin, and table grape growers and organizations, federal and state regulators [US-EPA, California Environmental Protection Agency's Department of Pesticide Regulation (DPR), California Department of Food and Agriculture], university researchers (SAREP, UC Statewide Integrated Pest Management Project, California Pesticide Impact Assessment Program), and environmentalists (Natural Resources Defense Council), was convened in 1998 by the California Association of Winegrape Growers (CAWG) and funded by US-EPA.

The major objectives of the partnership are to: 1) help satisfy US-EPA and USDA data needs for FQPA implementation; 2) generate crop-pest profiles for wine, raisin and table grapes, and to assist the grape industry in developing alternatives to FQPA Priority I and II pesticides; 3) identify critical research needs, demonstration needs, and field validation work on alternatives to FQPA Priority I and II pesticides; and 4) serve as a model pro-active approach to FQPA transition within the agriculture industry.

An executive summary as well as the 100-page winegrape pest profile is available on the CAWG web site at www.cawg.org. This review summarizes the key pests, non-chemical cultural and biological controls, Priority I (highest risk) FQPA pesticides used by the California winegrape industry, FQPA Priority II and III alternative chemicals, new alternative reduced-risk chemicals pending registration, and short and long term research priorities needed in light of implementation of FQPA.

**Summary of Important Pests**

1. Insect and Mite Pests. Grape vines are eaten by dozens of insect and mite species, but only about 12 species in six distinct pest categories [leafhoppers, spider mites, phylloxera, omnivorous leafrollers (OLR), sharpshooters and mealybugs] cause enough consistent and significant damage to be considered major pests in California. Of these, just three groups (leafhoppers, spider mites and OLR) are responsible for 85 percent of all insecticide/miticide chemical treatments on winegrapes.

2. Diseases. About two dozen diseases attack grapes, but only about 12 species in six distinct pest categories (powdery mildew, Botrytis and other bunch rots, Pierce's disease, Phomopsis, Eutypa and other canker diseases and measles) cause enough consistent and significant damage to be considered major pests in California. The fungus powdery mildew alone is responsible for over 80 percent of all chemical treatments for diseases on grapes.

3. Nematodes. Five categories of nematodes (root knot, citrus, root lesion, ring and dagger) are responsible for most of the damage done to California grapevines. Root knot and ring nematodes are responsible for most of the chemical treatments for nematodes on grapes.

4. Weeds. Over two dozen species of weeds are commonly found in California vineyards, and they are a major pest throughout the state.

5. Vertebrate Pests. Vertebrate pests fall into four categories (birds, rodents, deer and coyotes). Overall, they are considered minor pests and receive few chemical treatments.

**California Winegrape Pest Management System and the FQPA**

The crop profile submitted to the USDA emphasizes the nine major grape pest categories which receive the majority of FQPA Priority I and II chemical treatments: weeds, powdery mildew, Botrytis bunch rot, spider mites, leafhoppers, OLR, mealybugs, nematodes and sharpshooters. Each of these pest categories has at least one FQPA Priority I or II material registered, none is completely dependent on these materials, and in the short term, six out of the nine pests can be effectively controlled using currently registered materials as substitutes. The three exceptions are late-season OLR, root knot nematode and mealybugs. In the long run, there are several alternative materials pending registration for powdery mildew and spider mites, and at least one for weeds, leafhoppers, sharpshooters, Botrytis, root knot nematode and OLR.

The pesticide use data in the profile is from DPR's 1997 Pesticide Use Report. Cost estimates are based on expenses per acre per application, and

are categorized as low (<$10/acre), medium ($15-30/acre), high ($35-45/acre) and very high (>$50/acre).

The following three tables summarize information in the 1999 winegrape pest profile.

**Table 1** outlines three scenarios of possible future research priorities for the industry targeting key pests prioritized by: 1) the percentage of acreage treated with FQPA Priority I and II materials; 2) the number of effective, registered substitutes for FQPA Priority I and II materials; and 3) for comparison the 1997 American Vineyard Foundation (AVF) survey of priorities for research funding.

**Table 2** details the important winegrape pests, registered chemicals broken out by FQPA priority status (Priority I vs. Priority II and III), and new alternative chemical controls pending registration. It includes the percentage of acreage treated with the currently registered material in 1997.

**Table 3** outlines the same key winegrape pests and their current cultural, biological and other integrated pest management (IPM) practices, and a more detailed outline of possible short- (1-5 year time frame) and long- (5-10 years) term research priorities into alternative control methods for these pests.

**Table 1**. *Order of research priorities based on the percentage of acreage treated with FQPA Priority I and II materials, the number of effective, registered substitutes for FQPA Priority I and II materials, and the 1997 American Vineyard Foundation (AVF) survey.*

| Priority Based on Percentage of Grape Acreage Treated with Priority I Materials (in Parentheses) | Priority Based on te Number of Effective, Registered Substitutes for FQPA I Materials (in Parentheses) | Priority Based on 1997 AVF Survey |
|---|---|---|
| Weeds (90%) | Omnivorous Leafrollers (0) | Pierce's Disease |
| Powdery Mildew (44%) | Root know nematode (0) | Powdery Mildew |
| Botrytis Bunch Rot (17%) | Mealybugs (0) | Eutypa and Other Canker Diseases |
| Spider Mites (17%) | Spider Mites (1) | Leafhoppers and Sharpshooters |
| Leafhoppers: Grape and Vareigated (7%) | Leafhoppers (1) | Nematodes |
| Omnivorous Leafrollers (6%) | Sharpshooters (1) | Phylloxera |
| Nematodes (5%) | Botrytis bunch rot (3) | Bunch Rot |
| Mealybugs: Grape and Obscure (1%) | Weeds (4) | Weeds |
| Sharpshooters: Blue-green, Green, and Red-headed (1.4%) | Powdery mildew (4) | Fanleaf Virus |

**Table 2**. *Winegrape pests, registered chemicals by FQPA priority status, and alternative chemicals pending registration. Percent of acreage treated with a material in 1997 is in brackets.*

| Winegrape Pest | FQPA Priority I Chemicals | FQPA Priority I & II Chemicals | Alternative Chemicals Pending Registration |
|---|---|---|---|
| WEEDS | Oxyflurofen (Goal®) [31%]<br>Simazine (Princep®) [22%]<br>Paraquat dichloride (Gramoxone®) [19%]<br>Oryzalin (Surflan®) [14%]<br>Trifluralin (Treflan®) [2.5%]<br>Pendimethalin (Prowl®) [1.4%]<br>2, 4-D (Envy®) [0.3%]<br>Dichlobenil (Casoron®) [0.01%] | Diuron (Karmex®)<br>Norflurazon (Solicam®) [4.5%]<br>Glyphosate (Roundup®, Touchdown®, Glyphos®) [48%]<br>Napropamide (Devrinol®) [1.2%]<br>Fluazifop (Fusilade®) [0.4%]<br>Herbicidal soap (Scythe®)*<br>Isoxaben (Gallery®)* | Thiazopyr (Visor®)<br>Milestone® |
| POWDERY MILDEW | Myclobutanil (Rally®) [27%]<br>Triflumizole (Procure®) [16%]<br>Triademefon (Bayleton®) [1%] | Sulfur (various trade names) [83%]<br>Fenarimol (Rubigan®) [22%]<br>Narrow range oil (various trade names) [3%]<br>Insecticidal soap (M-pede®) [2%]<br>Azoxystrobin (Abound®)*<br>*Ampelomyces quisqualis* (AQ10®)* [2.4%]<br>Potassium bicarbonate (Kaligreen®)* | Chitosan (Elexa®)<br>Serenade®<br>Flint®<br>Sovran® |
| BOTRYTIS BUNCH ROT | Iprodione (Rovral®) [7.6%]<br>Mancozeb (Dithane®) [5%]<br>Benomyl (Benlate®) [4.2%]<br>Captan [0.26%] | Dicloran/DCNA (Botran®) [2.6%]<br>Narrow range oil (various trade names) [3%]<br>Cyprodinil (Vanguard®)*<br>Fenhexamid (Elevate®)* | Elexa®<br>Serenade®<br>Trichodex® |
| SPIDER MITES: WILLAMETTE AND PACIFIC | Propargite (Omite®) [13%]<br>Dicofol (Kelthane®) [4%] | Narrow range oil (various trade names) [3%]<br>Fenbutatin-oxide (Vendex®) [2.16%]<br>Cinnamaldehyde (Valero®)* | Avermectin (Agri-mek®)<br>Pyridaben (Pyramite®)<br>Biomite®<br>Alert®<br>Clofentazin (Apollo®) |
| | Methomyl (Lannate®) [4%]<br>Cararyl (Sevin®) [1%] | Imidacloprid (Provado®) [16%]<br>Imidacloprid (Admire®) [n/a]<br>Narrow range oil | |

| | | | |
|---|---|---|---|
| LEAFHOPPERS: GRAPE AND VARIEGATED | Dimethoate (Clean Crop®) [1.44%]<br>Naled (Dibrom®) [0.5%]<br>Endosulfan (Thiodan®) [0.23%] | (various trade names) [3%]<br>Pyrethrin (Pyrenone®) [0.25%]<br>Isecticidal soap (M-pede®) [2%]<br>Neem (Neemix®)* | Buprofezin (Applaud®)<br>Kaolin (Surround®) |
| OMNIVOROUS LEAFROLLERS | Methomyl (Lannate®) [4%]<br>Cararyl (Sevin®) [1%]<br>Phosmet (Imidan®) [0.26%]<br>Diazinon [0.5%] | Cryolite (Prokil®, Kryocide®) [24%]<br>Bt (Various trade names) [6%] | Spinosad®<br>Confirm® |
| NEMATODES | Fenamiphos (Nemacur®) [4%]<br>Carbofuran (Furadan®) [1%] | Methyl bromide# [0.5%]<br>Metam sodium# [0.02%]<br>1,3-Dichloropropene# (Telone®) [0.13%]<br>Sodium Tetrahiocarbonate (Enzone®) [3%]<br>*Myrothecium verrucaria* (DiTera®)*<br>Oxycom® | Imidacloprid (Admire®) |
| MEALYBUGS: GRAPE AND OBSCURE | Azinphos methyl ([0.04%] restricted 8/2/1999)<br>Methyl parathion ([0.08%] restricted 8/2/1999)<br>Chlorpyrifos (Lorsban®) [0.57%] | Imidacloprid (Provado®) [16%]<br>Imidacloprid (Admire®)* | Applaud® |
| SHARPSHOOTERS | Dimethoate (Clean Crop®) [1.4%] | Imidacloprid (Provado®) [16%]<br>Imidacloprid (Admire®)* | Kaolin (Surround®) |

**Table 3**. *Key winegrape pests, their current cultural, biological and other IPM controls, and short (1-5 years) and long (5-10 years) term research priorities.*

| Winegrape Test | Cultural, Biological and IPM Controls | Short Term Research Properties | Long Term Research Needs |
|---|---|---|---|
| Weeds | In-row cultivation<br>Mulches: Synthetic and organic<br>Subsurface drip irrigation | Test low volume application technologies<br>Test in-row cultivation implements<br>Test organic and synthetic mulches<br>Test in-row cover crop use<br>Develop action thresholds using contact herbicides | Nonchemical under-the-vine weed management |

| | | | |
|---|---|---|---|
| | Cover crops | Develop monitoring protocols and action thresholds for weeds<br>Implement weed surveys by growers/PCAs | |
| Powdery Mildew | Use of weather data and mildew models for timing applications<br>Rotate chemicals with different modes of action<br>Stop applications at fruit softening<br>Use of microbial pesticides like AQ10<br>Nutrient management to reduce tissue susceptibility<br>Canopy management | Test new chemistry fungicides<br>Test and implement mildew model<br>Resistance management<br>Improve dormant controls<br>Foliar nutrients to improve vine resistance | Employ resistance genes<br>Induced resistance |
| Botrytis Bunch Rot | Leafing/canopy management/trellising<br>Use of weather data and botrytis spray forecasting model<br>Regulation of crop load<br>Irrigation management | Test new chemistry and biological fungicides<br>Resistance management | Improved mechanization of leaf removal<br>New trellising systems<br>Employ resistance genes |
| Spider Mites | Soil, irrigation and dust management<br>Monitoring and use of action thresholds<br>Release of predatory mites | Use of sulfur<br>Timing/rate of predatory mite release<br>New tools/methodology to expedite monitoring<br>Use of 6-spotted thrips | "Fixing" problem soils |
| Leafhoppers | Monitoring/use of action thresholds<br>Vine water status<br>Sticky tape<br>*Anagrus* monitoring | New tools/methodology to expedite monitoring<br>Establish economic injury levels/action thresholds for varieties/regions<br>Register and test new chemistry materials<br>Irrigation/cover cropping to manage vine water status | Importation of a more effective biocontrol *Anagrus* sp. for variegated leafhopper |
| Omnivorous Leafrollers | Pheromone mating disruption<br>Use of OLR model<br>Sanitation/weed control | New tools/methodolog to expedite monitoring<br>Use of natural enemies such as Trichogramma<br>Test pheromone mating disruption | Importation of new natural enemies |
| Nematodes | Soil/water/ferility management<br>Resistant rootstocks<br>Soil amendments (cover crops, compost) | Test new chemistry and biological materials | Improving soil health<br>Test new rootstocks |
| | | Test new chemistry | |

| | | | |
|---|---|---|---|
| Mealybugs | Trellising/pruning<br>Monitoring | materials<br>Evaluate use of Admire<br>Use of ant baits | Improve biological controls |
| Sharpshooters | Weed control<br>Monitoring | Test new chemistry materials<br>Test light traps for monitoring<br>Inundative biological controls | Riparian vegetation management<br>Non-host barriers<br>Employ resistant genes |

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# National Organic Program Proposed Regulations

At press time, it is expected that the newly revised Proposed Regulations for the National Organic Program will soon be released for a public comment period. The long-awaited regulations, developed in response to the federal Organic Foods Production Act of 1990, will define requirements for products sold as "organic." When released, the regulations will be available for comment on the USDA National Organic Program's Web site at www.ams.usda.gov/nop.

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Winter/Spring 2000 (v12n1)

***Technical review***

# Final results of the third biennial national organic farmers' survey

*Erica Walz*

Organic Farming Research Foundation, Santa Cruz, California. 1999.

This biennial survey provides a comprehensive picture of the state of organic farming from the farmer's perspective. In late 1997 and early 1998, a 15-page questionnaire addressing the 1997 production year was sent to 4,638 certified organic farmers throughout the United States. A quarter of these farmers (1,192) from 44 states responded. The results from this survey provide information that should be useful to researchers, farm advisors, field consultants, policy makers, organic farming and sustainable agriculture advocates, as well as farmers and ranchers. The survey results are presented in the following eight categories.

**Organic Farming Research Priorities**

The objectives of this section were to identify the research priorities of organic farmers and to assess farmers' interest and willingness to be both practitioners of and collaborators in on-farm investigations. Farmers were asked eight questions about topics of organic farming research and their experience with on-farm experiments and collaborations with researchers. OFRF suggests that in order to provide research that is useful to organic farmers, these farmers should be utilized as a resource.

The top six topics ranked by order of importance include: 1) weed management, 2) the relationship between fertility management and crop health (pest and disease resistance), 3) relationship of organic growing practices to nutritional value of product, 4) soil biology, 5) crop rotations, 6) cover cropping.

Survey results also indicated that 62 percent of farmers are interested in collaborating in organic research projects; 23 percent reported previous experience in collaborative research.

**Information Resources**

This section was designed to ascertain the information needs of organic farmers, identify ways to meet these needs, and identify resources that are currently useful to farmers. The information needs most often reported were in the categories of pest management, production methods/systems, and soil management.

Some of the useful sources of information reported in the survey were:

*Personal Contacts*: other farmers, field consultants, suppliers, grower's associations.

*Places and Things*: farming and gardening books, conferences and seminars, periodicals (magazines, newspapers, and newsletters), field days and on-farm demonstrations.

A list of the favorite resources provided by the survey respondents, including contact information when possible, is provided as an appendix to the OFRF report.

**Products Grown and Marketed**

Gathering information on the quantity and range of organically grown products and the identity of the markets where they are sold prompted the questions in this section. Respondents were also questioned about the role of organic value-added products. Results show that the 1,192 survey respondents included:

- Vegetable and ornamental growers (57%)
- Field crop growers (52%)
- Fruit, nut and tree crop growers (40%), and
- Livestock (and by-products) producers (27%)

Thirty-one percent of the respondents also produce value-added products such as salad mix or dried fruits and vegetables.

**Organic Marketing**

This section presents information on marketing and the economics of organic production in the U.S. The OFRF survey is one of the few places where these kind of data are reported. Although economic and marketing information changes quickly, it is hoped that other researchers will use this as a basis for further study. The availability of raw marketing data, such as median farmgate prices for various organic products, allows farmers to make more informed planning decisions.

Survey results showed that most organic producers market their product wholesale (80%). Other producers primarily market directly to the customer (13%), or direct-to-retail (7%). It was interesting to note that more than half of the respondents plan to increase the number of acres in organic production; only 2 percent intended to decrease their organic production.

**Organic Management Concerns and Strategies**

The objectives of this section were to determine the most pertinent concerns (soil management issues; weeds, diseases, and pests; compatibility of genetically modified organisms) and to identify the most commonly used management strategies and materials.

A summary of organic producers' greatest concerns showed the following:

- Soil fertility and/or soil tilth management issue of greatest concern: building and maintaining organic matter levels
- Most difficult pest to manage: weeds

- Most frequently listed weed problems: foxtail, pigweed and quackgrass
- Most difficult weeds: Bermuda grass, Johnson grass and bindweed
- Most frequently listed insect pests: cucumber beetles, flea beetles, aphids, and Colorado potato beetles
- Most difficult insect pests: plum curculio and tarnished plant bugs

The most difficult animal pests and diseases were also reported in this section.

The most commonly used management strategies were crop rotations, mechanical tillage, hand weeding, cover crops, compost applications, beneficial insect habitats, and using disease resistant varieties.

Of the 1,192 respondents who responded to the statement, "Genetically engineered (recombinant-DNA) inputs are compatible with organic farming systems," 72 percent somewhat or strongly disagreed, 10 percent somewhat or strongly agreed.

**Organic Production Constraints and Challenges**

The questions posed in this section of the survey attempted to identify the barriers to organic production and marketing that farmers and livestock ranchers have experienced. Of the 1,161 farmers who answered the question, 58 percent began farming with organic production while 40 percent made the transition from conventional production. The 40 percent were asked what were the greatest barriers to the transition to organic production. Again, the largest response was weeds. Other often listed barriers included lack of information and experience and inability to identify markets for transitional/organic products.

Exploring current constraints to organic production and marketing, the highest ranked concerns included the cost of organically allowable inputs, uncooperative or uninformed extension agents, and lack of consumer understanding about organic food.

Livestock producers included price/and or availability of organic feed and lack of organic production regulations and developed market as their greatest barriers to organic production.

**Organic Certification**

This section identified farmers' levels of satisfaction with organic certification. Farmers were also questioned about their concerns and hopes regarding implementation of the National Organic Program.

When farmers were asked to rate their own certification agency's performance in a number of categories, certifiers were given high scores for adherence to certification standards, credibility as a certification agency, and quality of inspections.

This survey was distributed shortly after the controversial proposed federal organic rules were released by the USDA. It is interesting to note that farmers' greatest hopes regarding the federal organic standards were: 1) that the rules establish a level playing field for all U.S. organic producers, 2) that a stringent standard be implemented, and 3) that there be greater consumer

education and awareness about organic food and farming.

**Farm Management and Demographics**

This section presents demographic information of the survey respondents. A description of the types of farming operations represented by survey respondents include:

- All organic operations (75%)
- Mixed organic and conventional operation (24%)
- Single family operations or family partnerships (87%)
- Full-time farmers (62%)
- Part-time farmers (37%)

There were respondents from 44 states; the largest number (179) were from California, the second largest number (90) were from Washington state. This section also includes information on acreage owned and farmed, income, years of farming experience, age, and education.

In addition to reporting the actual data received in each section, this report also offers a discussion of the implications of the results in each section including comparisons to the results of OFRF's previous two national surveys. A highlight of this report is the Commentary offered at the end of several sections, each one contributed by a different organic farming expert. OFRF welcomes inquiries for specific cross-tabulations within this large database.

For more information: Organic Farming Research Foundation, P.O. Box 440, Santa Cruz, CA 95061, Tel: (831) 426-6606, Email: research@ofrf.org, Web site: www.ofrf.org

*DEC. 602 Contributed by Bev Ransom*

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Winter/Spring 2000 (v12n1)

***Technical review***

# The effect of organic amendments on the restoration of a disturbed coastal sage scrub habitat

*Thomas A. Zink and Michael F. Allen*

Restoration Ecology 6:52-58. 1998

Since at least 1980, conservation and restoration biologists have expressed concern that high concentrations of soil NO3- and NH4+ may favor introduced annual weeds (e.g., annual ryegrass, wild oat) over California native plants, including herbaceous species, shrubs and trees. Lignin-rich organic mulches may promote survival and growth of newly planted trees and shrubs, in part by suppressing some species of weeds. A better understanding of these soil-plant dynamics may help determine best practices for establishing hedgerows and diversifying field edges in agricultural settings.

At the Santa Margarita Ecological Reserve near Temecula, San Diego County, Calif., researchers Zink and Allen used a randomized complete block design with plot size 1.0 x 0.5 m to evaluate effects of organic mulches on survival and growth of seedling California sagebrush (Artemisia californica). The three treatments were: 1) pine bark; 2) oat straw; 3) no mulch (control). Response variables were assessed on eight occasions from February 1993 to June 1995, including seedling survival and estimated above-ground volume of California sagebrush plants, soil total N, soil N03-, several indices of soil microbial activity, and soil organic matter. Growth of potentially competing annual vegetation (e.g. wild oat [Avena fatua]) was not measured. Separate analyses of variance (ANOVA) were conducted for data from each date, with Fisher's protected least significant difference test used for detected differences among pairs of means.

A summary of the data shows that:

- Pine-bark mulch plots showed the greatest sagebrush survival rates over the course of the experiment (66% survival as contrasted with 42% for oat-straw and control plots).
- California sagebrush growth was also greatest in pine-bark mulch plots.
- Both mulches had significantly lower soil NO3- concentrations on six of eight sampling dates.
- From January 1994, mulch-amended plots had greater active fungal biomass than control plots.
- There were no strong nor consistent differences in bacterial biomass among the three mulch levels.
- Soil organic matter content did not differ among the three treatments for the first six months; from January 1994 through the end of the

research, organic matter content increased significantly under the bark-amended plots compared to control plots. No change in organic matter was detected under the oat-straw treatment.

The authors attributed increased survival and growth of California sagebrush to reduced NO3- availability in the mulched plots and suggested that this mediated competition by wild oat and other introduced annual weeds for other nutrients and water. The authors also mentioned the role of mulches in conserving soil moisture as a possible factor influencing plant growth. As no measurements were made of potentially competing vegetation nor of soil moisture, the mechanisms for the improved survival and growth of California sagebrush remain speculative.

For more information: Thomas Zink, Department of Biology, San Diego State University, San Diego, CA 92182.

*DEC. 603 Contributed by Robert L. Bugg*

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Winter/Spring 2000 (v12n1)

***Technical review***

# Michigan field crop ecology

*M.A. Cavigelli, S.R. Deming, L.K. Probyn and R.R. Harwood (eds.)*

Michigan State University Extension Bulletin E-2646. Michigan State University, East Lansing, Michigan. 1988

This extension bulletin is the result of a combined effort by Michigan agricultural scientists, Extension workers, and farmers to promote greater understanding of Michigan field crop ecology. It is geared toward environmental conditions and agricultural issues in Michigan, but has relevance to other states, including California. The book draws heavily on three projects being conducted at the W.K. Kellogg Biological Station in Kalamazoo County: 1) the Long-Term Ecological Research project (LTER), 2) the Living Field Laboratory (LFL), and 3) the Cover Crop Program. Research at LTER focuses on the ecological interactions of field crop ecosystems, and the patterns, causes and consequences of diversity in agricultural landscapes. LFL integrates basic ecological knowledge gained from the LTER into cropping systems appropriate to Michigan farming situations. The farmer-driven Cover Crop Program evaluates various aspects of cover crop selection and management.

According to the authors of this book, an ecological focus on cropping systems encompasses three major objectives: 1) enhancing soil quality, 2) managing pests and diseases with minimal environmental impact, and 3) recycling nutrients and residues effectively and efficiently. Management practices that help achieve all three of these goals, such as the use of crop rotation and cover crops, are highlighted in this book.

The concepts and principles of ecosystems are introduced in the opening chapter. The text defines an ecosystem as a geographic location on the earth's surface where energy and nutrients are captured and transformed by plants, animals and microbes. With that perspective, an ecosystem can be any size. Greater distinctions between types of ecosystems can be found when one looks closely at the impact of human activity. Farms are human-managed ecosystems designed to convert energy into harvestable products. They have different characteristics than natural ecosystems, but the same principles of energy flow, nutrient cycling, and biology apply to both.

The importance of ecological principles and relationships to the farmer is brought out clearly in subsequent chapters. Key topics covered include:

- Soil Ecology
  Biotic soil components and interactions
- Carbon
  Carbon as farmer's primary resource
  Carbon cycle

Managing carbon to maximize soil organic matter
- Nitrogen
- Major sources of nitrogen
  Nitrogen cycle
  Managing nitrogen to improve production and reduce environmental impact
- Cover crops
  Cover crops and crop rotation
  Cover crops, nitrogen and soil quality
- Pest Ecology and Management
  Population and community ecology
  Approaches to pest management
- Insect Community
  Insect communities and ecosystem complexity
  Landscape diversity
- Nematodes
  Nematodes in ecosystems
  Management of plant parasitic nematodes

The final chapter of the book, "Directions For Farm Change: Bringing it All Together," discusses how a holistic approach can be used to integrate ecosystem management objectives with other family and business goals. The authors recommend careful planning before making significant changes in production systems. Initial steps should include a thorough assessment of current resources and environmental conditions. An ecological perspective can be gained by getting a landscape view of the farm either through aerial photography or Geographical Information Systems (GIS) comparisons. Any specific changes in farm or ranch management should be made in light of the three objectives mentioned at the beginning of the book: enhancing soil quality, managing pests and diseases with minimal environmental impact, and recycling nutrients and residues effectively and efficiently.

Michigan Field Crop Ecology is 86 pages, and includes many instructive graphics, photos, and tables. It can be purchased for $12 through the MSU Extension Bulletin office or by contacting the KBS Extension office at (800) 521-2619.

For more information: Laura Probyn, Information Officer, Kellogg Biological Station, probynl@msue.msu.edu.

*DEC. 601 Contributed by David Chaney*

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***Resources***

# Print Publications

### Soil Biology

*Soil Biology Primer*, 50 pages, USDA-Natural Resources Conservation Service (NRCS), Soil Quality Institute, PA-1637, August 1999. This publication provides an excellent introduction to the living component of soil and its contribution to agricultural productivity, air and water quality. It includes units on soil health, bacteria, fungi, protozoa, nematodes, arthropods, and earthworms. The primer is intended for farmers, ranchers, agricultural professional, resource specialists, students, teachers, and NRCS personnel. It is formatted for use as a series of stand-alone teaching modules for the classroom or independent study. The free publication may be ordered via the Internet at www.statlab.iastate.edu/survey/SQI/catalog.html or contact the local NRCS office (check the federal government listings in the phone book under "Agriculture Department").

### Vegetable Production

*Sustainable Vegetable Production From Start-up to Market, 280 pages, 1999, Vernon P. Grubinger, Natural Resource, Agriculture, and Engineering Service, NRAES-104*. This handbook is intended to help beginning and experienced growers manage profitable and environmentally friendly vegetable production systems. It provides information on farm site selection, record keeping, marketing, soil fertility, crop rotation, cover crops, tillage, field preparation, seeds and transplants, irrigation and spraying systems, harvest and postharvest handling, season extension, integrated pest management, and environmentally friendly strategies for managing insects, diseases, weeds, and wildlife. Included are 91 illustrations, 36 sidebars, 20 tables and 32 profiles of Northeastern U.S. vegetable growers with enterprise budgets. The price is $42. To order contact the Natural Resource, Agriculture, and Engineering Service at (607) 255-7645, or on the Web at www.nraes.org.

### Organic Directory

*2000 National Organic Directory, 324 pages, published by the Community Alliance with Family Farmers*. Use this directory for finding organic growers, wholesalers, retailers, manufacturers/processors, farm suppliers and support businesses. It includes names, telephone and fax numbers, street and email addresses, Web sites, regions served, and terms and services. It also provides detailed farm and business listings, cross-referenced indexes of organic commodities bought and sold, lists of organic certifiers, resource groups, and state and federal laws on organic production and handling. Price: $49.95 plus $3.20 shipping in the U.S. (add $3.62 sales tax in California). Credit card orders accepted. Contact: Community Alliance with Family Farmers, PO Box 363, Davis, CA 95617; Tel: (800) 852-3832 or (530) 756-8518 ext 17; Fax:

756-7857; Email: nod@caff.org. A limited number of 1999 directories are available at the reduced price of $35 (plus shipping and tax).

**Teaching Food Policy**

*The Food System: Building Youth Awareness through Involvement, A guidebook for educators, parents and community leaders, 142 pages, 1999, Pennsylvania State University*. Today's teens have a limited grasp of the complexity of the food system and what it takes to sustain a viable agricultural sector in their region. This guidebook introduces educators and youth to the concept of the food system, emphasizing interactive learning, skill-building, and using the community as the classroom. Aimed at parents and educators of youth in grades 4 through 12, the guidebook provides background information, curricula recommendations, and resources. Cost: $15. To order, send checks payable to Penn State to Publications Distribution Center, 112 Agricultural Administration Building, University Park, PA 16802. For MasterCard or Visa orders, call toll-free (877) 345-0691.

*Food Systems: Youth Making a Difference: 11 Lessons for Teaching Food Policy to Today's Teens, 50 pages, 1997, Audrey Maretzki, Alison Harmon and Carol Giesecke, Northeast Network: Food Agriculture and Health Policy Education Program, Penn State Food Science Department*. This resource expands students' awareness of the importance of public and corporate policies in the food system and develops the knowledge and skills necessary for them to participate in policy decisions. To order, contact Audrey Maretzki, Penn State, 205 Borland, University Park, PA 16802-2504; Email: anm1@psu.edu. A limited number of free copies are available.

**Small Farm Report**

*The Multiple Functions and Benefits of Small Farm Agriculture in the Context of Global Trade Negotiations, Policy Brief No. 4, September 1999, Peter M. Rosset, Food First/The Institute for Food and Development Policy*. Rosset challenges the theory that small farms are backward and unproductive. Using data from many countries he shows the multi-functional character of small farms and makes the case that productive and efficient small farmers are better stewards of natural resources. Rosset discusses the process of trade liberalization, which many believe has already had negative effects on small farmers. Price: $6. Order on-line or download a PDF version at www.foodfirst.org/pubs/policybs/pb4.html, or contact Food First, 398 60th Street, Oakland, CA 94618; Tel: (510) 654-4400; Fax: (510) 654-4551; Email: salglynn@foodfirst.org

**Organic Standards Lists**

*The 2000 editions of two lists: Generic Materials List and Brand Name Products List, Organic Materials Review Institute (OMRI)*. These lists are comprehensive catalogs of allowable, regulated, and prohibited substances in organic agriculture and processing. They offer recommendations and opinions regarding the acceptability or unacceptability of generic materials and specific products used in organic production, processing and handling. The materials list contains information on more than 500 substances, including their status (allowed, regulated, prohibited, or under consideration), class, restrictions or qualifications, any recommendations of the U.S.

National Organic Standards Board on the material, and an appendix comparing IFOAM's materials status with OMRI's. The brand name list includes almost 300 brand-name materials using OMRI's own standards, cross-referenced to generic materials. The lists are available as part of an annual subscription that includes updates and industry news. The brand name list is also on OMRI's Web site. To subscribe or to apply for a product review, contact OMRI at Box 11558, Eugene, OR 97440: Tel: (541) 343-7600; Fax: (541) 343-8971; Email: info@omri.org; Web site: www.omri.org.

## Web Sites

### New Feature on SAREP's Web Site

SAREP-funded projects often report on research results in journal articles, books, and other publications. A list of many of these publications can now be found on the SAREP Web site at www.sarep.ucdavis.edu/grants/SelectedPubs.html.

We are pleased to see that information developed from these projects is reaching a wide audience through these publications.

### Genetic Engineering

www.omri.org

Organic Materials Review Institute has posted information on genetic engineering in organic farming and food systems at its site, including:

- Comments on the National Academy of Science's Workshop on Genetically Modified Plant Pesticides, May 1999;
- Comments to EPA on proposed permits for new strains of Bt corn, January 2000;
- Names and addresses of testing services that test for genetically modified crops and products;
- Comment to FDA on labeling of GE products;
- A link to the regularly updated list of GMO products on the Union of Concerned Scientists Web site;
- A review of current OMRI policy, which states the use of genetically engineered organisms or their products are prohibited in any form or at any stage in organic production, processing, or handling.

OMRI will be collecting data for a survey of producers and manufacturers who are willing to share GMO testing results.

### Calculate Almond Nitrogen Rates

A computerized tool for calculating a nitrogen fertilization rate for almonds is now available for download at www.sarep.ucdavis.edu/grants/reports/brown/nmodel.html. You will need Excel97 or newer to use the spreadsheet. It is not a stand-alone program. The spreadsheet is interactive, and has multi-colored graphs and charts. It is easy to use (with some practice) and by using optimal fertilizer application rates, a healthy crop can be produced and groundwater contamination can be prevented.

# Sources of Funding

### SAREP Requests for Proposals

SAREP has released Requests for Proposals (RFPs) to support educational events and graduate student projects. Funds will be awarded to events and projects that effectively advance SAREP's mission and goals. The program is particularly interested in funding proposals that address the sustainability of crop and livestock systems, or the connections between farmers, consumers, and communities in sustainable food systems. Please see the RFPs for a list of suggested topics. Proposals are due April 11, 2000. Awards will be announced by June 15; funds will be available on July 1, 2000. The grants will be in the following categories:

- Grants for educational events (up to $1,200 per event) will support workshops, field days, symposia, and seminars that take place between July 1, 2000 and June 30, 2001. These grants are available to individuals affiliated with California non-profit, tax-exempt organizations, state or federal government agencies, or California public or private educational institutions.
- Sustainable Agriculture Graduate Awards (SAGA) of up to $3,000 per student are available to registered graduate students attending any accredited institution of higher learning in California.

All current RFPs are posted on SAREP's Web site, www.sarep.ucdavis.edu. The site also describes projects and events funded in previous funding cycles. For more information, contact SAREP grants manager Bev Ransom at (530) 754-8546; Email: baransom@ucdavis.edu

### Organic Research Grants

The Organic Farming Research Foundation is offering funds for research on organic farming methods, dissemination of research results to organic farmers and growers interested in making the transition to organic production, and consumer education on organic farming issues. Projects should involve farmers in design and execution, and take place on working farms when possible. Proposals of up to $10,000 are encouraged. Matching funds and/or in-kind contributions are recommended. Proposals are considered twice a year; the next round of proposals must be received by July 15, 2000. To receive copies of grant application procedures, contact Grants Program, Organic Farming Research Foundation, PO Box 440, Santa Cruz, CA 95061; Tel: (831) 426-6606; Email: research@ofrf.org; Web site: www.ofrf.org

### Fertilizer Research Awards

The California Department of Food and Agriculture's (CDFA) Fertilizer Research and Education Program (FREP) is seeking suggestions for research and education projects that will advance the environmentally safe and agronomically sound use and handling of fertilizer materials. Projects may

involve research and/or education activities. Topics are being solicited in the following subject areas:

- Development, testing and demonstration of the use and benefits of practical field nutrient monitoring tools;
- Education and public information regarding the environmentally safe and agronomically sound use and handling of fertilizer materials;
- Nutrient/pest interactions;
- Irrigation interactions – water management as related to nitrogen use efficiency and the reduction of groundwater contamination;
- Fertilization practices – nutrient balance, crop nutrient uptake and partitioning foliar nutrient management, slow release fertilizers, cover crops and composting projects that involve the integrated use of composts and commercial fertilizers;
- Site specific fertilizer technology – demonstrating and quantifying applications for Precision Agriculture;
- Handling, transfer and storage of fertilizer materials with an emphasis on achieving regulatory compliance.

In 1999 FREP issued more than $550,000 in grants to university, industry and other agricultural research institutions. Research projects are funded through assessments on fertilizer sales in California. Additional information on the grant application process is available on the program's Web site at: www.cdfa.ca.gov/inspection/frep. Any individual or group is encouraged to apply. To be considered, a project suggestion limited to two pages must be submitted by March 17, 2000 to the CDFA Fertilizer Research and Education Program, 1220 N Street, Sacramento, CA 95814. For more information contact **Casey Walsh Cady** or **Athar Tariq**, (916) 653-5340; Fax, (916) 653-2407; or Email (ccady@cdfa.ca.gov).

**New USDA Funding**

The USDA has announced that $113 million in new funds will be spent on competitive research grants this year, distributed through a competitive grant process under the new Initiative for Future Agriculture and Food Systems (IFAFS). The needs of small- and medium-sized producers will be a priority. The program was authorized in the 1998 agricultural research bill with $120 million a year allocated for funding. This is the first time the money has been authorized for distribution. (Early in January an additional $60 million was released for specific Fund for Rural America research and economic development grants.) The IFAFS will fund competitive research, education, and extension grants that focus on production agriculture, natural resource management, and consumer issues. The Initiative's priorities include:

- Agricultural genomics and biotechnology risk assessment;
- Food safety and the role of nutrition in health;
- New uses for agricultural products, including biomass fuel sources;
- Natural resources management, pest management and precision agriculture;
- Farm efficiency and profitability, with an emphasis on small- and mid-sized family farms.

Requests for Proposals (RFPs) are expected to be published by early March. Proposals will be due by the end of April (exact date unavailable at press

time). The review process will give priority to multi-disciplinary and multi-institutional proposals, which includes private-sector organizations. The IFAFS Web site address is www.reeusda.gov/ifafs/ For more information about the IFAFS, contact: **Rodney Foil**, director, (202) 401-4921; Email: rfoil@reeusda.gov or **Cindy Huebner**, program assistant, (202) 401-4114; Email: chuebner@reeusda.gov.

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## ***Calendar***

*** SAREP WEB CALENDAR**

SAREP offers a regularly updated sustainable agriculture calendar on our World Wide Web site at: 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 as part of AgNIC at 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.

**MARCH 2000**

**6-9** *19th Vetebrate Pest Conference,* Mission Valley Hilton Hotel, San Diego, CA. Conference Chair: Terrell Salmon, Wildlife, Fish & Conservation Biology, University of California, One Shields Ave., Davis, CA 95616. (530) 752-8751; Fax: (530) 752-4154; tpsalmon@ucdavis.edu; www.davis.com/~vpc/welcome.html

**7-9** *Farming & Ranching for Profit, Stewardship & Community,* USDA Western Region Sustainable Agriculture Research and Education (SARE) program conference, Portland, Oregon. For producers, researchers, ag extension agents, scientists, policymakers, agribusiness representatives, educators. Will highlight SARE-funded research/education projects on cropping systems, grazing/livestock, biological pest control, community food systems, direct marketing. Contact: Gina Hashagen, Dept. of Horticulture, Oregon State University, Corvallis, OR at (541) 737-5477 or Mary Staben, (541) 737-5437, stabenm@bcc.orst.edu

**8** *Salinas Row Crops Conference*, Committee for Sustainable Agriculture (CSA). 1432 Abbott St., Salinas, CA. Workshops, farm tours. Highlights: strawberry & vegetable production, how to stay financially afloat, water on & off the farm. Contact: Jo Ann Baumgartner, CSA, 406 Main Street, #313, Watsonville, CA 95076, (831) 763-2111; csaefc@csa-efc.org; www.csa-efc.org

**15** *Bring Farm Edges Back to Life: Vegetation Management on Streams and Canals*, with Native Plants, 10 a.m. – 12 p.m. field workshop, Hedgerow Farms, Winters, Yolo County. Free. Sponsors: Yolo County Resource

Conservation District, Community Alliance with Family Farmers, CALFED, Audubon Calif. Contact: Paul Robins, Yolo County Resource Conservation District, (530) 662-2037 ext. 3, rcdnatives@hotmail.com

**24-26** *Farm to Table: Growing Healthy Foodsheds & Community,* Evergreen State College, Olympia, WA. Sponsors: Washington State University Coop. Ext., Cascade Harvest Coalition, & Washington State Dept. of Ag's Sustainable Agriculture Prog. Sessions: farmland preservation, sustainable farming practices, consumer food decisions, community-based marketing, globalization of food systems, faith-based connections to the food system, community-based food processing, sustainable local foodsheds, urban agriculture, connections between farming & culinary community. Keynote speakers: Wes Jackson, Joan Dye Gussow, Chef Tom French, Fred Kirschenmann, Michael Ableman, Jack Kloppenburg/ Bill Heffernan. Information: http://foodfarm.wsu.edu/farmtotable or call (360) 417-2279 8 a.m.-5 p.m. PST to have reg. materials faxed.

**27-29** *Soil, Food & People: A Biointensive Model for the New Century* Ecology Action conference, UC Davis, Davis, CA. Co-sponsors: University Extension-UC Davis, UNICEF, Wallace Inst. for Alternative Ag, CARE International, Columbia Foundation, Clarence E. Heller Charitable Foundation, The Hearst Corp., Alice Waters. Exploration of natural, human, global resources of the new century. Designed for professors, ag extension agents, farmers, development professionals, food systems specialists, ag policy managers, teachers, water & soil agency agents, farm organization reps. Speakers include: William Lacy, UC Davis; John Jeavons, Ecology Action; Louise Jackson, UC Davis; Jeff Mitchell, UC Kearney Ag Center; Mas Masumoto, farmer/writer; Marty Strange, Center for Rural Affairs; Kate Clancy, Wallace Inst. for Alter. Ag; Kathleen Merrigan, USDA Ag Marketing Service. Contact: University Extension, 1333 Research Park Dr., University of California, Davis, CA 95616-4852; (530) 752-0881; Fax: (530) 757-8777.

**29** *Salinas Winegrape Conference*, Committee for Sustainable Agriculture (CSA). 1432 Abbott St., Salinas, CA. Workshops, farm tours. Highlights: cover crops, stream bank restoration, weed management. Contact: Jo Ann Baumgartner, CSA, 406 Main Street, #313, Watsonville, CA 95076, (831) 763-2111; csaefc@csa-efc.org; www.csa-efc.org

**APRIL 2000**

**TBA** *Bring Farm Edges Back to Life: Winter Cover Crops in Annual Row Crops for Soil Quality & Winter Runoff Reduction*, 2-hour field workshop, Yolo County. Free. Sponsors: Yolo County Resource Conservation District, Community Alliance with Family Farmers, CALFED, Audubon CA. Contact: Paul Robins, Yolo County Resource Conservation District, (530) 662-2037 ext. 3, rednatives@hotmail.com

**28-May 2** *Taproot Agriculture & Leadership Seminar*, Melon Bluff Retreat Center, Savannah, Georgia. Sponsor: Learning Communities Project (partially funded by W.K. Kellogg Foundation). Focus: Multi-Functional Agriculture (how ag contributes to society through healthy food, water, wildlife habitat, regional economic opportunities). Cost: $750. Scholarships available. Information: (606) 986-5336; hhamilton@centerss.org; www.centers.org

**MAY 2000**

**8** *Pesticide Use Conference*, California State University, Sacramento. Sponsors: Calif. EPA's Dept. of Pesticide Regulation (DPR), US-EPA, Calif. Dept. of Food & Ag, University of Calif. Highlights of California's ten years of full pesticide reporting system. Contact: DPR, 830 K St., Sacramento, CA 95814-3510; (916) 445-4300; www.cdpr.ca.gov

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**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 Circle Design, Sacramento. Mailing address is: **UC Sustainable Agriculture Research & Education Program, University of California, One Shields Ave., Davis, CA 95616-8716.**

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