



The CENTER for
AGROECOLOGY
& SUSTAINABLE
FOOD SYSTEMS

in this issue:

Examining Public Service 1

The Center's successes and challenges in serving the public through its work

Addressing Issues Through Community-Based Research 5

Academics and community members team to address research questions

Center Produces New Online Curriculum 7

Web site offers resources for developing sustainable agriculture courses

National Educators Conference Planned 8

Center plans national conference on sustainable agriculture education

Getting Organic Roses Off to a Good Start 13

Garden manager offers advice for selecting, siting, and planting roses in an organic garden

Climate Change Affects Farming 16

Farmers are feeling the effects of a changing climate

From the Director 4

Research Updates 9

Center Notes 11

Events 20

the Cultivar

The CENTER for AGROECOLOGY & SUSTAINABLE FOOD SYSTEMS

UNIVERSITY OF CALIFORNIA, SANTA CRUZ

SPRING/SUMMER 2005 | VOL. 23, NO. 1

Serving the Public in a Public University

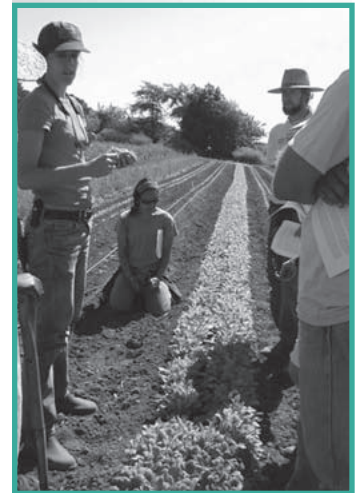
The role of a public university such as the University of California is to improve the human condition through research, teaching, and public service. At the Center for Agroecology and Sustainable Food Systems (the Center) we strive to meet the ideals of a public university by working to improve ecological sustainability and social justice in the food and agriculture system. Our work is multifaceted, covering a spectrum that includes research (theoretical and applied), education (practical and academic) and public service (with audiences ranging from local school children to international agencies). The Center provides a unique academic and practical forum for exploring alternative visions for food and agriculture, and pursues a research and education agenda that is broader than most agriculture—even sustainable agriculture—programs.

The Center works to give special attention to the silent voices in sustainable agriculture. This includes conceptual work that expands the way in which sustainability is defined so that it addresses political economic and social justice issues related to class, ethnicity, and gender (see, for example, Allen 1993). Empirical research at the Center also addresses these issues through projects that focus on fair trade, farm labor issues, and alternative agrifood institutions. The Center's broad agenda is enabled by specific historical factors and constrained by the same conditions that affect all public universities.

FACTORS COMBINE TO INSPIRE AGENDA

Several factors have converged to make our broad agenda possible: the Center's location in a social sciences division on an interdisciplinary, non-land-grant campus; the incorporation of practitioners and academics on our staff; and the concentration of nongovernmental organizations in the region focused on sustainable agriculture, the environment and family farms.

The Center is housed within the Division of Social Sciences at a campus that does not have an agriculture school. This unconventional setting is probably what enabled the Center to pioneer work in sustainable food systems and organic agriculture at a time when mainstream agriculture campuses were vehemently opposed to these ideas. It also makes possible the development of a strong social science research program to



Hands-on training in organic farming and gardening skills through the Apprenticeship program is a hallmark of the Center's experiential education work.

> continues on next page

THE CENTER'S HISTORY AND LOCATION MAKE IT WELL SITUATED FOR FULFILLING THE ACADEMIC AND SERVICE MISSIONS OF A PUBLIC UNIVERSITY

complement the natural science work, which is unusual in a program focused on food and agriculture.

The Center includes both academics and practitioners as staff and as students. This hybrid structure has enabled us to combine basic and applied research within and across disciplines, as well as provide research support and outreach programs for multiple partners and audiences. This provides a fluid, mutual “reality check” on theoretical and applied work. Practitioners provide academics with ideas and questions that need to be addressed, along with practical information, experience, and feedback on the relevance of research to the community in question. In turn, academics provide practitioners with new information, research support, and a broader context for their work and understanding of the agrifood system.

In addition to its work with graduate and undergraduate students, the Center works with nontraditional students through nonformal education programs. For example, the Apprenticeship program provides experiential training on gardening and farming techniques, small farm viability, marketing, social justice, and the environmental impacts of agriculture to nontraditional students. The Center has also developed a collaborative arrangement with a local NGO that provides training and education programs in Spanish to Latino farmers and farm workers in the Central Coast region.

The Center's work with these kinds of organizations is facilitated by a fortuitously high density of sustainable agriculture nongovernmental organizations (NGOs) in the Santa Cruz region, such as the California Sustainable Agriculture Working Group (CSAWG), the Community Alliance with Family Farmers, the California Certified Organic Farmers, and the Organic Farming Research Foundation. The geographical proximity between the Center and these organizations facilitates joint research and education projects, as well as the kinds of casual interactions that build networks. In addition, a project funded by the U.S. Department of Agriculture has strengthened the work of a multidisciplinary team of researchers and fostered collaborations with County, State and Federal agencies, local NGOs, Farm Bureaus, Cooperative Extension and researchers in other UCSC departments and other institutions.

Thus, the Center's history and location make it well situated for fulfilling the academic and service missions of a public university. However, challenges remain. A primary issue is how to provide service to the nontraditional students and underserved members of the public. In particular, how

The Center's social issues researchers examine such topics as the effectiveness of alternative food initiatives in addressing problems in the food system.

The image shows the cover of a research brief titled "Alternative Food Initiatives in California: Local Efforts Address Systemic Issues" from the Center for Agroecology & Sustainable Food Systems (CAFS). The cover features the CAFS logo, the title, and a list of findings. The findings include: large numbers of well-informed Californians concerned about the state of the current food system; the disconnect between food production and consumption; the disempowering of producers and consumers; the limited availability of affordable, nutritious food for low-income people; the need for a paradigm shift in the food system; and the potential for a shared vision of a sustainable food system.

can programs that serve groups considered marginal to the traditional research and education of the university agenda secure adequate resources for their work? Ironically, some of the programs for which the Center is renowned are also those that face the greatest challenges.

OPEN QUESTIONS AND CONSTRAINING FACTORS

Many of the same factors that have enabled the Center to pursue a whole-systems, progressive agenda have also constrained our ability to have legitimacy among conventional agricultural institutions and resulted in considerable uncertainty in funding and support from year to year. In particular, being outside of the land grant system with no major agriculture program on campus presents both funding challenges and limits the recognition of our work.

A key issue is how to effectively serve the scope of “publics” who have the right to claim resources of a public university. The Center prioritizes working with community groups that have largely been outside of the traditional agricultural extension frame, including organic farmers, food security groups, and food-system workers. While working with a diversity of farmers, including those typically underserved by mainstream agriculture programs such as those with limited capital and small-scale organic growers, has been a priority for the Center as well as for other sustainable agriculture programs, even this emphasis is skewed relative to their numbers among agrifood system workers. Of those who work in the agrifood sector, 78 percent work in food processing, retailing, and distributing; 11 percent

HOW CAN RESEARCH AND EDUCATION PROGRAMS DO A BETTER JOB OF ADDRESSING THE NEEDS OF LOW-CAPITAL AND SMALL-SCALE FARMERS, FARM WORKERS, FOOD INDUSTRY WORKERS, AND CONSUMERS?



Center Farm manager Jim Leap (left) works with researchers such as Jon Umble of Oregon State University (right) to address organic farming questions. Leap and Umble are researching ways to control symphylans in organic row crop systems.

supply inputs such as equipment and agrichemicals. Only 11 percent are farmers and farm workers directly involved in agricultural production. In California most of those who are involved in farming are hired farm workers. In California there are 18 farm workers for each farmer, and hired farm workers perform at least 80 percent of all the farm work in the state (Villarejo 1990).

How can research and education programs do a better job of addressing the needs of low-capital and small-scale farmers, farm workers, food industry workers, and consumers? This is much more challenging than working with the traditional producer clients of agricultural universities. The most disadvantaged and impoverished may not have the time and resources to participate in committee meetings and actions or actively engage with participatory or community-based research processes (see article, page 5 of this issue).

In addition, working with these groups may alienate more traditional clients. For example, credibility with growers is a major issue for sustainable agriculture programs that include social issues as a priority in their research agendas. USDA Sustainable Agriculture Research and Education director Jill Auburn reports that it is a struggle to maintain emphasis on the social “third leg of the sustainability stool” and to talk about social issues in a way that resonates with rather than alienates farmers (Auburn 2002). Still, the Center’s position

is that we need to be able to work with both radical and mainstream groups to effect change.

Finding funding to work with nontraditional groups and projects is a continual challenge. Currently, different groups have varying abilities to claim and provide resources in university programs, which has implications for who are considered legitimate audiences of these programs and which kinds of research agendas are likely to be funded. This creates a cycle of declining emphasis in certain areas. Since universities increasingly base decisions on the value of a person or program’s work on their ability to attract funding, this results in increased power and legitimacy for those able to do so.

One consequence is that researchers are drawn to court those with money, who by definition are not marginalized people. University research agendas are shaped to a large extent by extramural funding. Traditionally, public funds are used to cover the base costs (e.g., building, salaries, infrastructure) of the public research system, with private funding often covering discretionary research costs. For example, biotechnology companies now exert significant influence on the type of research that takes place through agreements with major campuses such as UC Berkeley. Private or profit-driven funders are unlikely to fund research on the environmental or social justice issues that comprise the Center’s research agenda. Yet, precisely because groups such as farmworkers, the hungry, and capital-limited farmers are

> continues on page 18



Social issues research at the Center includes studies of the ways that consumers perceive of social issues in the food system, including such issues as workers’ rights and salaries, and the value of small-scale agriculture.

from the director



As members of a public university, with our salaries paid all or in part by the citizens of California, what is our role in the University of California system? What issues should we be addressing in our research? What audiences should we be serving in our teaching and outreach efforts? These are questions we continually ask ourselves as we plan our research and education programs. In the cover article, associate director Patricia Allen addresses these issues as we discuss the way that the Center's work has taken on the challenges inherent in trying to meet the needs of those who have often been overlooked by traditional agricultural programs. This article is based on a paper that Allen and I prepared for a seminar I presented at Yale University's colloquium series.

In a related topic, social issues researcher Phil Howard addresses the idea of community-based research (*page 5*), in which community members identify problems for study. This type of research provides a way for academics to address pressing social and environmental issues, and to make their work more relevant to the broader community. Howard discusses some of the ways that the Center has worked with local growers and community groups to address their questions and concerns.

Our work in developing resources for those teaching sustainable agriculture topics continues to grow. This spring, curriculum specialist Albie Miles completed an online resource that links educators to a comprehensive course outline, catalogue description, and annotated resource lists for post-secondary instructors (*page 7*). This project grew out of Miles's work developing our two popular teaching manuals, *Teaching Organic Farming & Gardening: Resources for Instructors*, and *Teaching Direct Marketing & Small Farm Viability: Resources for Instructors*.

Another outgrowth of the curriculum development work is an upcoming conference focusing on sustainable agriculture education at two- and four-year colleges and universities (*page 8*). Convened by the Center and by UC Davis's College of Agriculture and Environmental Sciences and Student Farm, the conference will address the status of sustainable agriculture education, course and program content, teaching methods, and much more.

Our efforts to reach the gardening audience with the message of sustainable techniques also continue to evolve, thanks this time to a grant from the Stanley Smith Horticultural Trust. A portion of this grant funded a booklet on organic rose care for home gardeners, written by garden manager Orin Martin and excerpted here (*page 13*).

center staff

CAROL SHENNAN, PH D	Director
PATRICIA ALLEN, PH D	Specialist–Social Issues, Assoc. Dir.
SEAN SWEZEY, PH D	Specialist–Extension, Assoc. Dir.
BARBARA MAXIMOVICH	Assistant to the Director
JOAN TANNHEIMER	Program Assistant
DIANE NICHOLS	Apprenticeship Coordinator
ORIN MARTIN	Apprentice Course Associates
CHRISTOF BERNAU	
AKIKO MINAMI	Apprentice Course Assistant
ANN LINDSEY	Apprentice Course Grant Writer
ALBIE MILES	Curriculum Editor
JIM LEAP	Operations Manager
THOMAS WITTMAN	Operations Assistant
NANCY VAIL	CSA Coordinator
MARTHA BROWN	Senior Editor
JAN PEREZ	Associate Specialist, Social Issues
JANET BRYER	Research Assistants
ALEX FIELDS	
DIEGO NIETO	
CLAIRE PHILLIPS	
MARC LOS HUERTOS, PH D	Post-Doctoral Researchers
PHIL HOWARD, PH D	
DORON COMERCHERO,	Second-Year Apprentices
NATHAN FRIGARD, JENNIFER JAMES, KATE POSEY, CHRIS SIEGRIEST, LAURA WILLIAMS, ADAM WILSON, DARRYL WONG	

faculty affiliates

Weixin Cheng, E. Melanie DuPuis, Laurel Fox, Margaret FitzSimmons, Greg Gilbert, Steve Gliessman, David Goodman, Julie Guthman, Karen Holl, Deborah Letourneau, Michael Loik, Manuel Pastor, Ravi Rajan, Alan Richards, Patricia Zavella

the Cultivar

Spring/Summer 2005, Volume 23, No. 1

The Center for Agroecology & Sustainable Food Systems is located at the University of California, Santa Cruz. Through our research and educational efforts we seek to increase understanding of the social, economic, political, and ethical foundations of agricultural sustainability; to establish the ecological and agronomic basis for sustainable production systems; and to demonstrate and facilitate the use of information critical to the adoption of these systems.

The Cultivar is published twice yearly. Current and back issues are available. Editor: Martha Brown.

On the UCSC campus, the Center manages the 25-acre Farm and 2-acre Alan Chadwick Garden, both open daily to the public. For more information about the Center and its activities, please contact us at:

CASFS, University of California
1156 High Street, Santa Cruz, CA 95064
831.459-4140 or 459-3240 (telephone) 831.459-2799 (fax)
www.ucsc.edu/casfs

I hope you enjoy the wide variety of topics we touch on in this newsletter.

- CAROL SHENNAN, DIRECTOR

Making Research Relevant to Communities: Community-Based Research

Former Harvard president Derek Bok said, “most universities continue to do their least impressive work on the very subjects where society’s need for greater knowledge and better education is most acute” (1990 p. 122).

Bok was referring to social issues, such as poverty and chronic unemployment, though ecological issues could also be subject to this criticism. A small but growing number of researchers, including those at the Center for Agroecology and Sustainable Food Systems, are working to make academia more relevant to the problems facing our society through “community-based research.”

WHAT IS COMMUNITY-BASED RESEARCH?

Community-based research is “research that is conducted by, with, or for communities” (Sclove et al. 1998). It stands in contrast to most research, which primarily addresses the needs of private businesses or focuses on esoteric scholarly subjects. Community-based research, on the other hand, is intended to benefit non-profit organizations or local governments that will use the results for practical and positive change (Sclove et al. 1998).

One example of a community-based research process is the Dutch science shop system. In the Netherlands, every public university has a center that accepts research questions from community groups, and involves faculty or students in answering these questions (Wachelder 2003). The first science shops were established in the late 1970s by Dutch faculty and student volunteers. They were active in social movements, such as opposition to nuclear power, and wanted to make the production of knowledge more democratic. These early science shops gained popular political support, which led to their expansion, as well as a small amount of government funding. There are currently 50 science shops in the Netherlands and they answer approximately 2,000 questions a year (Sclove et al. 1998). The types of projects have ranged from requests from environmental groups to estimate the risks from pollutants to the exploration of social concerns such as understanding the causes of teenage disaffection.

For a question to be addressed it must come from a group that can demonstrate it lacks the resources to conduct the research, and that it will make good use of the results. While early research was conducted primarily by faculty members, much of the work is now conducted by students who receive academic credit for their efforts. Because academic requirements typically require research and writing papers



Laura Tanaka

Community members in Santa Cruz, California meet to discuss ways of improving the region’s food system.

anyway, addressing community research questions has not increased the workload for students or professors. Unlike many student papers that end up in the recycle bin or on the shelf to gather dust, students’ research papers are used by the community organizations and government agencies that have commissioned them. This benefits these organizations, which often lack the resources of large corporations and governments, and students gain valuable real-world experiences (Sclove et al. 1998).

LACK OF FUNDING SPURS CITIZEN INVOLVEMENT

In the U.S., however, community-based research is not as well funded as it is in the Netherlands. A survey of 50 American centers dedicated to this type of research (far fewer per capita than the Netherlands) indicated that most rely on small grants from private foundations, rather than public funds (Sclove et al. 1998).

In other cases, the lack of funds has meant that, rather than submitting the research question and applying the results, members of communities have been involved in planning the research, collecting data, and analyzing the data. Such participation gives non-experts more control over the production of knowledge than more traditional forms of research. Of course, it also means that only communities able to invest the time and resources required are able to have their questions addressed.

Examples of community-based research conducted in the U.S. include –

- College students who worked with townspeople in Washington State to plan the relocation of their town,

> continues on next page

CENTER RESEARCHERS ARE ALSO WORKING WITH COMMUNITY GROUPS ON THE CENTRAL COAST OF CALIFORNIA TO IDENTIFY AREAS WHERE LARGE POPULATIONS HAVE LIMITED ACCESS TO FOOD RESOURCES THAT ARE HEALTHY, CULTURALLY APPROPRIATE, AFFORDABLE AND SUSTAINABLE.

which was in the path of a dam being constructed on the Columbia River.

- Faculty and students in Chicago who worked with local residents to create a farmers' market and food cooperative in a primarily African-American neighborhood that didn't have any supermarkets.

- Residents of Woburn, Massachusetts who linked contaminated drinking water to health problems in the community. They worked with Boston University professors to scientifically document a cancer cluster and demand that the problem be addressed. The legal aspects of this effort were described in the book and film *A Civil Action*.

CENTER PARTICIPATION IN COMMUNITY-BASED RESEARCH

The Center for Agroecology and Sustainable Food Systems has been involved in a number of community based research efforts. For example, Center researchers have worked with growers to conduct field trials of organic production techniques and pest control strategies, and graduate students have been awarded grants by the Center to conduct surveys with the close participation of the farmers involved.

In 2004, researchers at the Center worked with other UC researchers and nongovernmental organizations to establish the Activist Researcher Consortium (ARC). The purpose of ARC is to build an ongoing forum for discussion, research, and education among California academics and community organizations with an interest in working together toward a socially just food system. Research questions that were prioritized at the initial ARC workshop included –

- What are the barriers, or perceived barriers, to socially just businesses? Are businesses that try to incorporate social justice into their practices more likely to fail? How do socially just businesses that are economically successful internalize their ethical commitments?

- How does access to food differ by ethnicity and socioeconomic status? How does farmworker access to food compare with that of other groups of people?

Efforts are currently underway for activists and researchers to begin addressing these important questions collaboratively.

Center researchers are also working with community groups on the Central Coast of California to identify areas where large populations have limited access to food resources that are healthy, culturally appropriate, affordable and sustainable. The results will help organizations target programs to increase food security in the region and may

also identify promising markets for small-scale growers who have limited marketing opportunities.

Center staff members are also participating in a student-led coalition at UCSC that is building support for a more ecologically sustainable and socially just campus food system.

Finally, representatives of the Center worked with other organizations in Santa Cruz County to organize a community forum on the food system in February 2005. This day-long meeting had an agenda that was determined entirely by the participants, and they raised a number of questions that they continue to investigate. Some of these inquiries included –

- What food policies from other areas would work well in our county?

- How can we help local farms while also getting healthy food to low-income people?

- How can we increase support for school gardens?

The Center for Agroecology and Sustainable Food Systems plans to remain involved in community-based research as funding allows (see cover story). However, as mentioned, there are very limited funds available for this type of research and for research on sustainable food systems in the United States. Currently, the community-based research conducted by the Center is funded primarily through a grant from the U.S. Department of Agriculture to examine Central Coast food and agricultural systems. Expanding this work will require additional support. With tax increases unlikely, this would mean a reallocation of existing public research funds and an increase in support for community-based research on the part of private donors and foundations.

If you're a researcher, funder, or part of an organization with an interest in furthering the Center's efforts in community-based research, contact the Center at 831.459-3240 or email phoward@ucsc.edu.

– PHIL HOWARD

References

- Bok, Derek. 1990. *Universities and the Future of America*. Durham: Duke University Press.
- Sclove, Richard, Madeleine Scammell, and Breena Holland. 1998. *Community-based research in the United States: an introductory reconnaissance*. Amherst, MA: The Loka Institute. July.
- Wachelder, Joseph. 2003. Democratizing science: various routes and visions of Dutch science shops. *Science, Technology & Human Values* 28 (2): 244-73.

On-Line Curriculum Project Links Educators to Instructional Resources

Whether you're teaching a 2-hour community gardening workshop on irrigation or a semester-long college course examining conventional and alternative agriculture practices, there's a new online resource that will help you locate the best materials to meet your instructional needs.

Albie Miles, the Center for Agroecology and Sustainable Food System's curriculum development specialist, has headed an effort to review hundreds of educational resources—textbooks, popular books, web sites, videos, PowerPoint presentations, and more—to identify the highest-quality and most relevant materials on sustainable agriculture available. The result is a web-based instructors' tool, *Exploring Sustainability in Agriculture: An Online Sustainable Agriculture Instructional Resource*, available through the Center's web site (<http://zzyx.ucsc.edu/casfs/instruction/esa/index.html>).

Visit the site and you'll find a catalogue description and outline for a comprehensive course on sustainable agriculture, appropriate for the community college, state college, or university level. The outline addresses topics in social and environmental sciences; plant, soil, crop, and animal sciences; pest management; natural resource management; the adoption of sustainable agriculture; and the growth and development of sustainable agriculture and the organic food industry.

Each major topic heading in the course outline links to an annotated list of materials (in both PDF and Word format) for instructors to use in designing a class, seminar, lab, or workshop. Topics can be taught as stand-alone units, combined to create a more extensive course, or used to supplement an existing course.

"The goal of the project is to encourage the free exchange of high-quality instructional resources intended to serve the rapidly developing field of interdisciplinary and experiential sustainable agriculture education," says Miles.

With interest in sustainable agriculture increasing and the number of college farms rapidly expanding, this project is particularly timely. A recent article by New Farm senior writer Laura Sayre on the New Farm website notes, "In the past decade alone, farm projects have been established at over a dozen schools, including Cornell University, Rutgers University, Michigan State University, New Mexico State University, Vassar College, Bennington College, Prescott College, Oberlin College, the University of Vermont, and the College of the Atlantic. Relatively new programs join older student farms at schools like the University of California at Davis, UC Santa Cruz, Berea College in Kentucky, and

Warren Wilson College in North Carolina, which started its farm program in 1894." (see www.newfarm.org/features/0104/studentfarms/studentfarms.shtml).

PROJECT DEVELOPMENT

The online curriculum project originated in 1999 when Miles and other Center staff began gathering reference materials for the Center's two instructor manuals, *Teaching Organic Farming and Gardening: Resources for Instructors* (published in 2003), and *Teaching Direct Marketing and Small Farm Viability: Resources for Instructors* (published in 2005; see <http://zzyx.ucsc.edu/casfs/instruction/index.html> for information).

In October 2003, the Center received funding from the California Food, Fibers, Futures Project (CF3, a program of the Kellogg Foundation) to develop a set of resources for instructors interested in teaching introductory-level sustainable agriculture courses on campuses with college farms. These resources were intended to help college instructors develop and implement new courses that address issues of natural resource sustainability in agriculture and could be applied across the range of California's post-secondary institutions.

Project developers requested input from instructors at post-secondary institutions that offer experiential and on-farm sustainable agriculture courses. A wealth of ideas came from educators from the three systems of higher education in California (Community College, California State University, and University of California systems) and from agricultural professionals and instructors from institutions around the U.S.

One outgrowth of the Center's curriculum development efforts is a national conference of sustainable agricultural educators planned for January 24–25, 2005 at the Asilomar Conference grounds in Pacific Grove, California. *Facilitating Sustainable Agriculture: A National Sustainable Agriculture Education Conference* will be held just prior to the Ecological Farming Conference (January 25-28, 2006).

"The coordinators of this conference want to encourage the continued development of sustainable agriculture as a field of study within U.S. colleges and universities," says Miles. "We see this participatory conference as a way to address the many challenges and opportunities of learning and teaching in post-secondary schools offering sustainable agriculture education." For more information on the conference, see page 8 of this issue.

— MARTHA BROWN

Center Plans National Sustainable Agriculture Educators Conference

The Center for Agroecology and Sustainable Food Systems (the Center), in collaboration with the UC Davis College of Agriculture and Environmental Sciences and Student Farm, will convene a conference on education in sustainable agriculture on January 24–25, 2006. **Facilitating Sustainable Agriculture: A National Sustainable Agriculture Education Conference**, will take place in association with the Ecological Farming Conference (January 25–28) at the Asilomar Conference Grounds in Pacific Grove, California.

As interest in sustainable agriculture grows, educational programs that focus on the field are emerging at a number of colleges and universities around the U.S. “We want to encourage the continued development of sustainable agriculture as a field of study within U.S. colleges and universities,” says Albie Miles, the Center’s curriculum development specialist. “This conference is a way to facilitate a new national and international dialogue on learning and teaching in post-secondary agriculture education.”

The conference is designed for faculty, staff, students and administrators from two- and four-year colleges and universities. The agenda will address a broad range of topics, including –

- the current state of sustainable agriculture education in U.S. colleges and universities;
- course and program content and teaching methods used within existing sustainable agriculture programs;
- strategies for the development of sustainable agriculture as a field of study that serves to meet defined education and training needs;
- assessment of specific program development needs for agricultural educators within existing or developing sustainable agriculture programs; and,
- collaborations to facilitate the development of new and existing sustainable agriculture programs.

Helping plan the event are faculty, staff and graduate student researchers from UC Davis and

UC Santa Cruz. The advisory council to the project includes faculty and staff from San Jose State University, Oregon State University, Iowa State University, Pennsylvania State University, North Carolina State University, Michigan State University, The Denmark Royal Veterinary and Agricultural University, and many other U.S. land grant institutions, state and community colleges.

Please note: To best meet the specific goals and objectives of conference participants, the conference coordinators are currently conducting a needs assessment of U.S. institutions with developing or established sustainable agriculture programs. The content of the conference will be designed around addressing common programmatic needs. Please see below for information on how to access the needs assessment and other conference information from the Center’s web site. Please send completed needs assessments to Albie Miles at afmiles@ucsc.edu.

For more information on the conference, contact Albie Miles at afmiles@ucsc.edu, 831.459-4661, or Mark Van Horn at mxvanhorn@ucdavis.edu, 530.752-7645. Additional details about the needs assessment, conference program, and registration information are posted on the Center’s web site (www.ucsc.edu/casfs).



Jon Kersey

Topics to be addressed at the conference in January include the use of campus farms, such as the UCSC Farm, in sustainable agriculture education programs.

Social Issues Researchers Present Findings at National Conference

The Center's social issues research was well represented at the annual joint meetings of the Agriculture, Food, and Human Values Society and the Association for the Study of Food and Society in Portland, Oregon this spring. Social issues specialist Patricia Allen, and researchers Phil Howard and Jan Perez presented results from a variety of Center projects.

Allen and Perez discussed their study of consumers' and food-system activists' concepts of social justice in the food system—how these groups define social justice, their vision for it, how they think about it, and what aspects of social justice are important to them. This information will help organizations that are developing criteria for defining social justice within the food system, particularly those working to develop social justice-based criteria as part of certification labels.

Howard and Allen presented results from a mail survey administered to consumers in the Central Coast region. In part, the survey measured whether consumers felt they had more power in a locally-based food system. Their findings showed that consumers who obtain foods at least once a week from direct, local sources (e.g., household gardens, Community Supported Agriculture projects, farmers' markets, roadside stands) scored higher on an index measuring "empowerment" as it relates to the food system. Those respondents who frequently purchased organic food did not score higher on the empowerment index. The index included such factors as the consumers' perceived knowledge about their food, availability of information about their food, availability of food they wanted, satisfaction with choices available, and ability to change the food system.

Allen, along with Carolyn Sachs of Penn State University, gave a paper that explores the conflict and ambivalence women experience in providing food for their families, their households, and themselves. They argue that food processors, supermarkets, and restaurants are profiting from the time squeeze that many women experience as they come to rely on convenience foods and pre-cooked meals. At the same time, the food industry and the fashion industry send conflicting messages to women, who are encouraged to indulge in junk food but expected to have "perfect" (i.e., thin) bodies.

The conference also included a session focusing on Allen's latest book, *Together at the Table: Sustainability and Sus-*

tenance in the American Agrifood System, published last winter by Penn State University Press. The book distills more than ten years of Allen's research on the discourses, agendas, and strategies of U.S. alternative food movements and institutions.

Panelists highlighted the theoretical, substantive, and practical contributions of Allen's book. "This workshop showed that both academics and activists find this research to be accessible and important to the future of alternative agrifood movements and institutions. It is extremely gratifying to know that *Together at the Table* is considered both an important scholarly contribution and relevant for those working to create change in the American agrifood system," says Allen.

Strawberry/Vegetable Rotation Study Gives Clues to Nutrient and Disease Management

In the agricultural fields above Elkhorn Slough in northern Monterey County, a checkerboard of strawberry, vegetable, and cover cropped plots is yielding clues as to how best to grow strawberries organically while maintaining the health of the agroecosystem.

UC Santa Cruz researcher Joji Muramoto oversees the complex study, which involves rotating strawberries with vegetable crops and cover crops in various intervals (1–4 years between strawberry plantings), and comparing strawberry yield and soil health with plots where strawberries are grown in consecutive years (no rotation). The five-year project is part of an effort funded by the U.S. Department of Agriculture to improve scientific knowledge about organic systems and to strengthen the Central Coast network of organic farmers and agricultural researchers (see *The Cultivar*, Vol 22, No. 2, Fall/Winter 2004 for additional details). Dan Schmida of Sandpiper Farms is the study's grower cooperator. Other UCSC researchers involved in the project include Center director Carol Shennan, Environmental Studies professor Steve Gliessman, and specialist Sean Swezey, along with Steve Koike, plant pathologist with UC Cooperative Extension.

The researchers are testing the effects of several ecological farming practices, including suppressing disease with "biofumigation," an alternative to fumigation with synthetic chemicals such as methyl bromide. Broccoli residues and mustard crops are incorporated into the soil prior

> continues on next page



Joji Muramoto measures soil moisture levels at multiple depths in an Elkhorn Ranch strawberry plot as part of a study on water and nutrient movement in the soil.

to vegetable and strawberry plantings. As the broccoli and mustard break down they release naturally occurring chemicals thought to reduce the levels of soilborne diseases such as *Verticillium dahliae*, which causes wilt in strawberries. Other practices include rotating strawberries with broccoli and spinach crops, which do not host *Verticillium*; using strawberry cultivars (Seascape and Aromas) less susceptible to disease; and incorporating compost to enhance biological activity and increase levels of organic matter.

Learning to manage nutrients efficiently is another of the project's goals. "Strawberries are a tricky plant—they need nitrogen at the right time and in the right amount," says Muramoto. "We're looking at the best ways to adjust fertilizer and compost levels and application timing in order to meet crop demands throughout the season while decreasing the loss of nitrogen from the system." Nitrogen that leaches into groundwater or runs off the fields can pollute adjacent waterways—including the ecologically sensitive Elkhorn Slough—and cost growers money in the form of lost resources.

"The weather pattern here on the Central Coast makes nutrient management challenging," says Muramoto. Most of the season's rainfall occurs from late November through April, when the shallow root systems of strawberry plants are not fully developed. Although applying a plastic mulch over the beds prior to heavy rains helped decrease the loss of nitrogen from the system, there was still a significant level of nitrogen in storm runoff from the fields following the season's first rains.

"We found that surface runoff, rather than leaching, is the main way that nitrogen is carried out of the fields," says Muramoto. "If there is a high level of inorganic nitrogen in the soil when the first heavy rains hit, a significant portion of that nitrogen can be lost." Muramoto notes that growers should work to reduce the basal nitrogen level in the soil by minimiz-

ing pre-plant compost applications, especially if a broccoli residue has been incorporated prior to planting the strawberry crop. "Growers can take advantage of the nitrogen that the broccoli residue provides and save money by reducing the use of other inputs," he says.

Monitoring for *Verticillium dahliae* has shown that incorporating broccoli residue prior to planting strawberries consistently reduced the numbers of *Verticillium* propagules in the soil. In contrast, incorporating mustard did not reduce *Verticillium* numbers. Although it was thought that the chemicals released by both broccoli and mustard should suppress *Verticillium* populations, studies suggest that another factor may be at work. "Broccoli residues

may increase the population of bacteria that break down both broccoli and *Verticillium*, which have similar cellular structures [chitin], whereas mustard may not stimulate populations of these bacteria," says Muramoto.

Despite the fact that the mustard did not lower the populations of *Verticillium*, no wilting effect was seen in the strawberry crop. According to Muramoto, other researchers suggest that mustard residues may stimulate competition among microbes for entry points into the strawberry roots, thus blocking some of *Verticillium*'s ability to infest the crop. However, Muramoto noted that it's difficult to tease out the specific effects of mustard and broccoli in this study since the crops are planted in sequence.

In addition, Muramoto learned that *Capsella bursa-pastoris*, or shepherd's purse, a common weed in the region, also hosts the *Verticillium dahliae* fungus and can increase its presence in the soil. Based on this finding, plant pathologist Steve Koike suggests that weed management should be integrated with soil-borne disease management.

The research will continue for another season, during which all of the fields will be planted with strawberries. "This fifth year of the study will tell us the most about the various rotations' effect on strawberry production and plant health," says Muramoto.

Anaerobic Residue Digestion Offers Promise for *Verticillium* Control

Controlling soil-borne diseases without synthetic chemical fumigants such as methyl bromide is one of the biggest challenges facing organic growers. This is particularly true for organic strawberry growers, whose delicate crop is subject to a range of soil-borne fungal diseases. *Verticillium* wilt, caused by the fungus *Verticillium dahliae*, can

be particularly vexing—growers are often forced to find “clean” ground every year in order to avoid planting strawberries into areas where levels of *Verticillium* have built up over time. As housing and other development projects eat away at the amount of available farmland in areas such as California’s Central Coast region, finding new ground is becoming more difficult.

One promising technique for controlling a number of plant pathogens across a range of crops comes from the Netherlands and Japan. The technique involves growing and incorporating a cover crop, watering the area, and then sealing it with an oxygen-impermeable tarp to create anaerobic conditions that kill the fungal pathogens. Japanese use wheat bran in place of a cover crop for a carbon source.

In the summer of 2004, Center director Carol Shennan, researcher Joji Muramoto, and UCSC Farm manager Jim Leap conducted a trial of the anaerobic residue digestion (“tarping”) technique in a field that had experienced an outbreak of *Verticillium* wilt and *Phytophthora* root rot (caused by the fungal organism *Phytophthora* sp.) in strawberries. The average population of *Verticillium dahliae* in the plot’s topsoil (0-15cm deep) was 3 micro-sclerotias per gram soil; only 1 micro-sclerotia per gram of soil is needed to cause *Verticillium* wilt in strawberry plants.

The randomized, complete block design compared two types of cover crops (a mix of buckwheat and Sudan grass versus mustard), with or without tarping. The cover crops were incorporated on July 13, 2004; following incorporation, a soil sample densely infested by *V. dahliae* (17 microsclerotia per gram of soil) was buried as an inoculant in each plot.

Leap then applied 50 millimeters (2 inches) of water to the plots overnight; a plastic tarp was applied on July 14 and kept in place for 12 weeks, during which Eh (a measure of whether anaerobic conditions are achieved) and temperature were measured in the plots.

Regardless of cover crop type, the number of *V. dahliae* microsclerotia in recovered inoculants decreased to 0.3 per gram in the tarped plots (a mortality rate of 98%), while the number in the non-tarped plots increased to an average of 23 per gram. Eh levels indicated that weak anaerobic condition (Eh 100-350 mV) developed during the first two weeks of tarping.

On November 18, 2004, strawberries were planted in all plots. Disease symptom of strawberry plants, *V. dahliae* population in the soil, and strawberry fruit yield are being monitored through the growing season, with initial findings showing a lower level of *Verticillium* wilt symptoms in the tarped plots.

Based on the encouraging results from the 2004 study, a new tarping trial was initiated this summer at the UCSC Farm. The researchers are comparing tarping periods of 3, 6, and 12 weeks. The study will also compare covering the plots with clear versus black tarps to see whether differences in temperature affect levels of *V. dahliae*. The plots will be planted with strawberries in the fall of 2005.

Grants Fund Education and Training Efforts

A new greenhouse, a national conference on sustainable agriculture education, scholarships for apprentices, a farm-to-cafeteria project, and a stock-free demonstration field project at the UCSC Farm—these are a few of the things that new grants and gifts will help fund in the coming year. Along with key funding for the Apprenticeship training program, a total of \$135,000 has been raised so far for 2006 education-related projects. We are grateful to the following funders for their support –

The True North Foundation has granted \$30,000 for the new Farm to Cafeteria project along with the continuation of the Community Supported Agriculture (CSA) Education and Outreach program. The new funding will allow Apprenticeship staff to work with the Campus Food Systems group at UC Santa Cruz to bring organic produce to the campus cafeterias and restaurant while doing outreach and education on campus about sustainable agriculture and local food systems.

A \$25,000 grant from the AT&T Pebble Beach Charities will go toward the construction of a new educational greenhouse at the UCSC Farm. We are grateful for this grant brought in with the help of the Monterey Peninsula Foundation, which will help us leverage further funding for the new greenhouse.

Newman’s Own Organics, with a \$30,000 grant, and Nan McEvoy, with a \$5,000 gift, have provided ever-important core support for the Farm & Garden Apprenticeship training in organic farming and gardening.

A new grant of \$5,000 from the Foundation for Sustainability and Innovation will allow Apprenticeship staff to do more extensive outreach and recruitment than ever, with a goal of increasing the number and the diversity of applicants to the six-month Apprenticeship training program.

An anonymous donor gifted \$25,000 to create the “Wild-flower Fund” for Apprenticeship scholarships, a fund that could support as many as seven apprentices over the next seasons of the Apprenticeship course.

A new demonstration field at the UCSC Farm will be managed without any inputs from animal sources, thanks to a \$4,000 grant from the Nalith Foundation. This “Stock-free” or vegan organic farming demonstration site will provide information on cover crop and plant-based composts as alternatives to animal manures and other animal products such as bloodmeal and bonemeal.

> continues on next page

Farm Foundation has pledged \$10,000 for the coordination of the first-ever National Sustainable Agriculture Educator's Conference being planned for January 2006 (see page 8 of this issue for details). This conference will bring together instructors from colleges, universities, and other educational organizations and will be put on in conjunction with the Ecological Farming Conference at Asilomar, California, on January 24–25 (preceding the January 25–28 Eco Farm conference).

The California Agriculture Teachers Association (CATA) and the Kellogg Foundation, through the California Food, Fibers, and Futures (CF3) project, granted \$3,000 each to make possible the creation of a sustainable agriculture course curriculum for the community college level as well as a one-day agriculture teachers' in-service training hosted by the Center in June. Program organizer Albie Miles, the Center's curriculum specialist, noted that colleges throughout the state are developing sustainable or organic agriculture courses at their institutions. The in-service training program for college and university instructors focused on the way that innovative production and marketing strategies used in organic agriculture are influencing the way that food and fiber are produced and sold.

2006 Apprenticeship Announced

The Center's six-month *Apprenticeship in Ecological Horticulture* course provides training in the concepts and practices of organic gardening and small-scale farming. This full-time program is held annually at the 25-acre Farm and 3-acre Alan Chadwick Garden on the UCSC campus. The Apprenticeship course carries 20 units of UC Extension credit for the approximately 300 hours of formal instruction and 700 hours of in-field training and hands-on experience in the greenhouses, gardens, orchards, and fields.



Jon Kersey

Kim Allen is a member of the 2005 Apprenticeship course, learning organic farming and gardening skills through the Center's 6-month training program.

Each year 35 to 40 apprentices come from all regions of the U.S. and abroad for the six-month course. Most apprentices choose to live on the Farm in their own tents, sharing cooking and other community responsibilities in a common kitchen/dining facility. Tuition is \$3,250. Due to our interest in increasing the diversity of participants in the program, there are several scholarships available for people of color and limited income applicants.

The next Apprenticeship course will run from mid April to mid October, 2006. Application deadlines for the 2006 program are September 1, 2005 for international applicants and October 15, 2005 for U.S. and Canadian citizens. For more information, contact:

Apprenticeship Information
CASFS, UCSC
1156 High Street
Santa Cruz, CA 95064
(831) 459-3240, apprenticeship@ucsc.edu

Detailed information and application materials are available on the Web:

www.ucsc.edu/casfs/training/index.html

New Research Brief Examines Participatory Action Research in Coffee-Growing Communities of Nicaragua and El Salvador

The Center recently produced the sixth title in its Research Briefs series. *Participatory Action Research and Support for Community Development and Conservation: Examples from Shade Coffee Landscapes in Nicaragua and El Salvador* describes a form of research that links both social and ecological questions while generating information that can be used to foster environmental and social change. Based on their experiences conducting research in coffee-growing areas of El Salvador and Nicaragua, Ernesto Mendez and Chris Bacon report and reflect on the opportunities and challenges involved in conducting participatory action research (PAR). Both Mendez and Bacon recently completed their doctoral work in Environmental Studies at UC Santa Cruz.

The Research Brief uses examples from Mendez and Bacon's studies in Tecuba, El Salvador, and Matagalpa, Nicaragua to illustrate the process of PAR. Like many coffee-growing communities, coffee growers in these areas are suffering severe economic hardships due to steep declines in coffee prices. Mendez's work in El Salvador originally focused on biodiversity conservation and farmer livelihoods on shade coffee farms. As the coffee crisis deepened, his "action research" grew to include action-oriented activities such as farmer trainings in organic growing techniques, development of alternative markets, and diversification on the farm.

Bacon's experience in Nicaragua includes work with coffee cooperatives tied to the Fair Trade movement. His dissertation focused on the livelihoods of households linked to cooperatives selling into different coffee trade networks

> continues on page 17

Organic Rose Care: Sources, Siting, & Planting

Selecting, siting, and planting your roses are the first steps in establishing healthy plants that will thrive in an organic garden setting. Here I offer some guidelines to get your roses off to a good start.

ROSE SOURCES: MAIL ORDER VS. RETAIL

Unless you're buying roses in quantity or looking for rare offerings, especially heritage or old garden roses, buying retail has its advantages over mail order shopping. Whether you're purchasing bareroot or container-grown roses, retail shopping lets you inspect and accept or reject individual plants. Quite often retail prices are on a par with or cheaper than mail order.

High-end retail nurseries offer a plethora of modern bush and climbing rose varieties with the occasional smattering of heirloom types. Several mail order nurseries that specialize in heirloom roses are listed in the Mail Order Sources at the end of this article.

TYPES: BAREROOT VS. CONTAINER GROWN

As with fruit trees, the earlier in the season a rose goes in the ground (first safe planting date in your area) the sooner and stronger it establishes in year one. Bareroot roses planted in January are almost fully established shrubs in year two.

Bareroot roses are sold in three grades –

1. Grade #1 (best quality): 3 canes starting within 3" of the bud union. Hybrid tea canes must be at least 18" long, floribundas 15" long, climbers 24".
2. Grade #1 1/2: minimum 2 canes. 15" for Hybrid Teas; 18" for climbers; 14" for Floribundas. Can produce good plants.
3. Grade #2: 2 canes 12" long and of questionable vigor, quality.

Container-grown plants, usually available March–June, yield flowers the first spring but sometimes at the expense of overall plant establishment. Container plants also take more care and skill to successfully transplant in the garden, and cost approximately twice as much as bareroot plants. They will also establish twice as quickly as bareroot plants, although both methods yield cuttable stems in year one.

CAVEAT EMPTOR — BUYER BEWARE

Remember, while perusing color catalogues, that there has never been a poor-performing, disease-prone variety of anything, ever, in any catalogue description. It is all about superlatives—good, better, best. One of the advantages of

container-grown roses is that they are often pushing buds or in bloom at the time of purchase, giving you a chance to evaluate them in person. It is also a good idea to visit public rose gardens in the spring to see the real blooms, not color-enhanced photographs.

Rose growing, indeed gardening, is a bit about dreaming and a bit about realism. Go ahead and dream, but temper it with a good dose of reality. If after two (arguably three) years a rose has not performed for you, grit your teeth and “prune it with a spade.” Do the detective work and ascertain why this choice didn't work out. Was it a matter of less-than-optimal care, or perhaps a poor varietal selection for your weather conditions? Some problems can be corrected, while others—such as climate—can be an ongoing source of frustration. And sometimes, as with hard-to-grow varieties of fruit (Blenheim apricot and Cox's Orange Pippin apple come to mind), the merits of a rose bloom in the vase outweigh the challenges of a variety in the garden.

CHOOSING A LOCATION

Among the myriad requirements for successful rose growing is picking the “right” spot in the garden. By and large, roses require a minimum of 6–8 hours a day of full sun during the growing season (more is better). Exceptions to this rule are the hybrid musk roses. This intriguing class of roses, developed in the early 20th century, is capable of growing and blooming prolifically in moderate shade (40%).

In warm interior locations a preference for morning sun, and in coastal locales the warmth of afternoon sun, push growth and can keep foliage dry going into foggy evenings. In most species of plants, heat activates scent, so to a certain extent the warmer the spot, the more you will avail yourself of fragrance. A wind-protected location will enhance both scent and growth.

Roses will grow best in well-drained soils. In fact, poor drainage will trigger or compound many minor and a few major (and potentially terminal) problems. Before planting your roses, perform this test: dig a sample planting hole 2 feet wide and 18 inches deep; fill it with water. It should drain within an hour (20–30 minutes is ideal). While any textural class of soil (sand, silt or clay) can grow roses (with assistance), medium-textured silts and well-drained, improved clays have more “grow power.” Sands require constant and copious amounts of fertilizers and water.

Along with sun and soil considerations, give some thought to your rose view shed. Where do you walk, sit or pause in

> continues on next page

the garden? Roses show off their blooms best when viewed from slightly above or below eye level. Some roses should be placed on the edge of a well-frequented path, walk or drive, even at the risk of their meandering away from their appointed places. Some interesting candidates for planting along paths include –

Gertrude Jeckyl – This David Austin rose is arguably the most intensely and exquisitely scented rose in creation.

Eglantine – This species (wild) rose, made famous by Sleeping Beauty as the briar rose, is nothing much to look at: small (1”–2” across) pink single flowers, a scraggly shrub that can’t decide whether it’s a bush or a vine, an infinite number of tiny, pain-inducing thorns. But when brushed or bruised or even undisturbed on a warm afternoon, the foliage wafts the scent of green apples up to 15–20 feet away.

Double Delight – This hybrid tea is top of the charts for scented modern roses. The rub is, you have to look at the gaudy pink over white flowers (like something out of an ice cream sundae shop) that occur both profusely and frequently.

Madame Hardy – Among the Damask roses, Madame Hardy offers the essence of the class along with pristine white blooms, each sporting a green “eye” at its center.

PLANTING

The old gardening quip, “Don’t plant a \$5 tree in a 50 cent hole,” needs to be adjusted for inflation and roses: “Don’t plant a \$15 shrub in a \$5 hole.” The planting hole needs to be wide and deep enough to accommodate the plant’s eventual mature root system—in general, 2 feet wide and 18 inches deep is adequate.

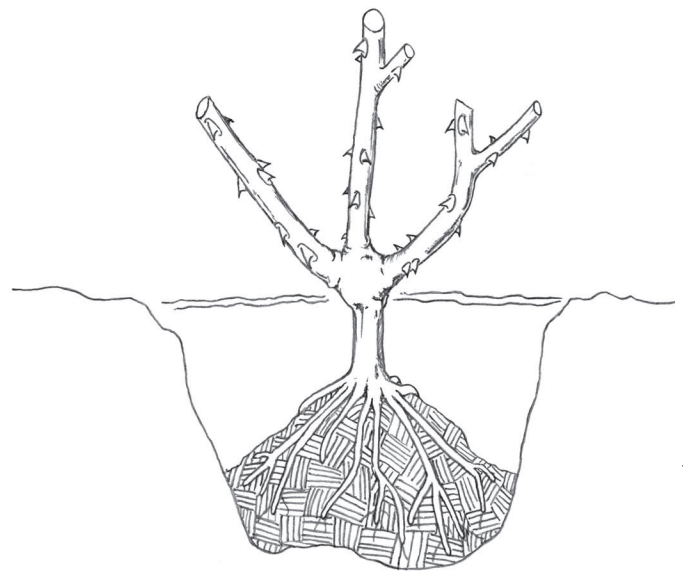
The bottom of the planting hole should be fashioned with a soil cone (for bareroot plants) to accommodate and spread the roots. Roots can be trimmed slightly to fit in the space available. If the roots appear dry (bareroot), soak them for 1–2 hours prior to planting.

It is arguable as to whether even moderately fertile fill soil needs to be augmented with compost/fertilizer. If it does, no more than 25–30% by volume should be added. The best and easiest strategy for enhancing fertility at planting time is to top dress with a concentrated rose fertilizer, compost and mulch.

The fill soil should be firmed in incrementally as you fill the hole. The bud union (basal swelling above the shank) should be positioned at or slightly above soil level in mild winter areas. Orientation of the bush is not critically important; whatever angle/presentation appeals to your aesthetic will be fine. Creating a watering basin (18”–24” deep) around the bush will aid in initial watering and can be maintained or smoothed over eventually, depending on your watering method.

Rose Requirements Guide

- Sunlight** Minimum 6–8 hours/day direct sunlight. Note: hybrid Musk roses and the variety Gruss an aachan do well in partial shade.
- Soil** Drainage is paramount, although roses can grow well on any textural class (sand, silt, clay) if amended and improved.
- Water** Modern bush roses are shallow-rooted (2’ wide x 18” deep) so shallow/frequent watering is required every 7-14 days (thus the need for good drainage).
- Fertility** Moderate nitrogen to grow the bush; high phosphorous for good root development and free flowering; moderate potassium for stem strength. Frequent inputs: annual compost and mulch application after winter pruning; application of concentrated granular or pelleted fertilizer and compost coincident with dead-heading and summer pruning after each round of bloom. Optional periodic liquid nitrogen (fish emulsion) soil drench.
- Protect** Protect blooms and foliage and reduce water loss by protecting the plant from wind.



Place the rose’s roots over a cone of soil in the bottom of the planting hole to spread them evenly.

Larry Lavendel

The initial watering in of the new plant could be more accurately described as “puddling in.” It is critical to thoroughly wet all the soil in the planting hole and ensure good root-soil contact. As the soil dries down (in the top 6”–8”) to the point where it no longer balls together when compressed by hand, reapply water. At no time can a rose tolerate a water deficit and perform well.

Most texts recommend mounding up soil 8”–12” high at the base of the plant for a short period (until growth starts) to prevent the shrub from drying out. I find this practice to be laborious, injurious and absolutely unnecessary in all but the windiest locations. Mulching with compost, wood chips, straw, cocoa bean, or rice hulls helps protect the surface structure of the soil, reduces water loss, acts as a physical barrier to fungal spores, and has a pleasing visual effect.

– ORIN MARTIN

This article is excerpted from A Rose Primer: An Organic Approach to Rose Selection and Care, by Orin Martin, which will be published in fall 2005 by the Friends of the UCSC Farm & Garden, a community support group of the Center for Agroecology and Sustainable Food Systems. For information on ordering the publication, contact 831.459-3240 or jonitann@ucsc.edu.

Mail Order Sources

Antique Rose Emporium
9300 Lueckemeyer Road
Brenham, TX 77833
800.441-0002, www.antiqueroseemporium.com
Good selection of antique varieties

Garden Valley Ranch
498 Pepper Road
Petaluma, CA 94952
707.795-0919, www.gardenvalley.com
Wide selection, mostly modern varieties; open for tours

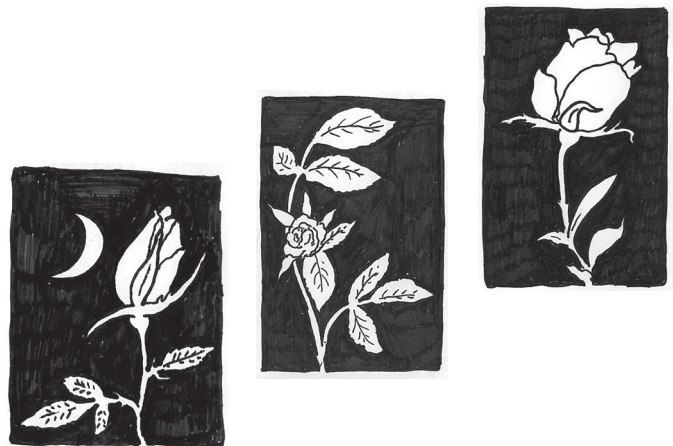
Jackson and Perkins
1 Rose Lane
Medford, OR 97501
877.322-2300, www.jacksonandperkins.com
Mostly modern varieties

Roses of Yesterday
803 Brown’s Valley Road
Watsonville, CA 95076
831.728-1901, www.rosesofyesterday.com
Great spectrum of old garden roses

Wayside Gardens
1 Garden Lane
Hodges, SC 29695
800.213-0379, www.waysidegardens.com
A good blend of old and new, including David Austin roses

Planting Guide

When to plant	Dormant season (January–March 1) for bareroot plants Late winter into early summer (late February–June) for container plants
Spacing	Hybrid teas 3–4’ Grandiflora 3–4’ Floribunda 2–4’ David Austin 3–5’
Planting hole	2’ wide x 18” deep
Fertilizer	Augment fill soil with 25–30% well-aged compost Top dress with concentrated rose fertilizer and compost
Prep (bareroot)	Soak roots 1–2 hours prior to planting; trim injured roots
Prep (container)	Pre-wet soil in container and minimize soil ball disturbance; transplant in late afternoon
Placement	Place spread roots over a soil cone Place bud union (swelling) slightly above soil level
Watering	Soak soil, create good root-soil contact Create a watering basin
Pruning	Remove any dead or damaged wood, cut back canes (evenly) to an outward-facing bud
Mulch	Mulch soil surface with compost, wood chips, straw, cocoa beans or rice hulls
Understory	No weed or understory planting/competition



Forrest Cook

Harvesting Chaos—Changing Weather Patterns’ Impact on Agriculture

Most keyboard jockeys would die for the view from Orin Martin’s office window: apple trees in blossom, lines of citrus, dozens of varieties of flowers and neat rows of peppers, garlic and potatoes.

Martin’s farm is on the University of California, Santa Cruz campus, where for the last 30 years he has been an instructor in the Apprenticeship course of the Center for Agroecology and Sustainable Food Systems, one of the nation’s oldest organic agriculture curriculums. Strong, stout and built like a tree trunk, with sun-bleached cornsilk hair, thick hands, and deep crowsfeet around his eyes from years of working outdoors, Martin loves farming, and it shows whenever he starts to talk about his craft, as he will happily do for hours on end.

In recent years, however, something has been amiss in Martin’s idyllic setting. The weather is changing in strange ways. And for a farmer that’s bad news.

“I don’t know if you can talk about predictable weather anymore,” Martin said on a recent walk through the three-acre Alan Chadwick Garden on the UC Santa Cruz campus. “Each of the last ten years has been anomalous in one way or another. The weather here used to be like clockwork. Around March 15 it would stop raining. But all through the ‘90s we had rain into April, May and even June. If you talk with farmers and gardeners, oh yeah, they think there’s something off.”

Martin is right. From New England to the Midwest to California, farmers and scientists are noticing that once-dependable weather patterns are shifting, and concern is growing that those changes will have a significant impact on our agriculture system. Farmers in the United States and around the world are likely to face serious challenges in the coming decades as new kinds of weather test their ability to bring us the food we all depend on.

The culprit is climate change, caused by society’s burning of fossil fuels. When it comes to global warming, farmers—who are more attuned to weather patterns than most people—may be the proverbial canaries in the coalmine.

“Some of the changes in weather are consistent with climate change predictions, and that’s real troublesome,” says Michelle Wander, a professor of soil science at the University of Illinois. Wander recently published a report with the Union of Concerned Scientists, which predicted that within 25 years Illinois summers may resemble the hotter climate of Arkansas. “By the end of the century, I think we will really be suffering.”

The weather changes underway differ by region. In Cali-

fornia, which has a typical Mediterranean climate with a wet winter and a dry summer, rainfall is stretching later and later into the spring. New England is experiencing a warming trend, with average temperatures up 1.8° F over the last century. Winter warming in the northeast is even more pronounced; temperatures between December and February increased 4.4° F in the last 30 years, according to a study by the University of New Hampshire. In the Midwest, the springs and summers have become unseasonably wet, while the summers get hotter and drier.

“What we’re experiencing is rather abnormal,” says Dave Campbell, who farms 225 acres of oats, wheat, corn, soy and hay in Maplepark, Illinois, land that has been in his wife’s family since the 1830s. “It just keeps raining and raining. Last year, from May 10 to June 21 we had 13 inches of rain. Normally we have 38 inches of precipitation the whole year. Last year we had real trouble with our wheat crop because it was so excessively wet. We just get dumped with rain.”

The weather, of course, has never been exactly dependable—farmers have always been at the mercy of the vagaries of sun and rain. But general weather patterns have at least been broadly predictable, allowing farmers to know when to sow their seed, when to transplant, when to harvest. As weather patterns become less reliable, growers will be tested to develop new rhythms and systems for growing crops.

For a city dweller who thinks that food comes from Safe-way, rain may seem like an unqualified benefit when it comes to growing food. Farmers know better. Too much rain at the wrong time can make it difficult to plan or harvest crops. Above-average rainfall also contributes to fungi and insects that can dramatically reduce crop yields. Too much warmth is equally problematic. Some plants require a certain number of frost days each year in order to thrive the following spring. As temperatures warm, farmers who are accustomed to growing, say, blueberries in Maine or soybeans in Indiana may find themselves having to either shift to different crops or actually move their operations to new locales. Unreliable weather will make it harder for farmers to be as productive as we have come to expect.

“When it comes to the weather, we expect the unexpected,” says Henry Brockman, 41, a vegetable farmer in Congerville, Illinois. “It’s not as predictable as it used to be. It used to be that the ground was frozen all winter. Now in the winter it freezes and thaws, freezes and thaws. Some of the models show this part of the country getting very dry, and that would be a big problem. If the weather got any drier, I wouldn’t be able to farm as I do.”

ADAPTATION IS CRITICAL

Climate change is likely to impact different parts of the world in vastly different ways, climatologists and agronomists say. Scientists at a recent international conference in London reported that warming temperatures could lead to substantial harvest reductions in major food crops such as wheat, soy and rice. And for years the World Bank and others have been warning that climate change will be especially burdensome on poor countries in the tropics, where soil quality is generally inferior. According to a study conducted in the Philippines, for every one degree C increase in temperature, there will be a 10 percent reduction in yields for rice, a staple crop for billions of people.

But here in the U.S., most observers agree, it's doubtful that climate change could cause a food security crisis. The U.S. food system—though highly concentrated in terms of ownership and control—is geographically very diverse, which means that crops could be shifted to other areas if necessary. Also, the U.S. produces so much surplus grains for animal feed and food processing that it would take enormous crop failures to create real food scarcities. At least for residents of the U.S., a climate-change induced famine is unlikely.

The uncertainties wrought by global warming, however, could be make-or-break for many already-struggling farmers unless they are prepared to adapt to new conditions.

“For farmers, climate change is yet another darkness in the night, another stress for farmers facing uncertainties,” says Bill Easterling, director of Penn State’s Institutes of the Environment and a longtime researcher into climate change and agriculture.

Farmers are a famously adaptive lot, well accustomed to reacting to forces beyond their control. The worry among scientists is that if the agriculture establishment does not take climate change seriously enough, it will become much more difficult to respond effectively when weather disruptions hit. Easterling says the window for farmers to successfully adapt to new weather conditions is about six to 10 years—the time it takes for researchers to breed new seed varieties suited for specific conditions.

“What would worry anyone is if climate change starts to exceed the system’s built-in adaptive response,” Easterling says.

DIVERSITY MAY CUSHION EFFECTS

Among farmers and researchers, there is disagreement about which types of growers climate change will impact most—large agribusiness growing operations, or smaller, family-run farms. Some agriculture industry observers says that the bigger farmers will have an advantage in coping with weather changes, as they will have more resources to switch to new crops. Others says that since family farms usually grow a wider range of crops, their biological diversity will make it easier to cope with whatever changes occur.

“A large corporate potato farm may be more vulnerable because they have all of their eggs in one basket,” says Vern Grubinger, a berry specialist at the University of Vermont.

“It’s very hard to find small, family farms that have only one thing. They may have 100 or so species. You won’t be in nearly as bad a shape if you were growing only one or two crops.”

“When you have a real diversified profile with what you’re planting, you know that at least something will do well,” says Santa Cruz farmer Martin. “And that’s an advantage.”

What all agriculture experts agree on is that farmers need to start preparing today for climate change. Growers ought to be thinking about what warmer temperatures, fluctuations in precipitation, and an increase in extreme weather events will mean for their farms, and how they can respond.

“This is change; it’s not necessarily disaster,” says Grubinger. “The disaster will come if people aren’t prepared.”

– JASON MARK

*Jason Mark is the co-author, with Kevin Danaher, of *Insurrection: Citizen Challenges to Corporate Power*, and is a student in the Center’s Apprenticeship training course. A version of this article originally appeared on the news and views site *Alternet*, www.alternet.org.*

Center Notes

continued from page 12

(Fair Trade, organic, and conventional). Ultimately, the action portion of Bacon’s research helped growers find ways to market more coffee through better-paying networks thanks to training to improve coffee quality. The union of cooperatives involved in the PAR research also launched a community-based agro-ecotourism project to provide an alternative income stream.

Both researchers found that the process of participatory action research involved a significant investment of time and energy in developing relationships with the farmers and staff of participating coffee cooperatives. PAR also broadened the role and spectrum of community members involved in the research, giving the community a voice in how the studies were conducted and a stake in the work’s outcome. The PAR process has evolved into an ongoing commitment to the communities, with both Bacon and Mendez continuing to support research, marketing, and training for the growers.

The Center initiated its Research Brief series in 2003 to provide timely reports of Center research activities and of work funded by Center grants. The reports are targeted to growers and researchers, extension personnel, policymakers, students, and others interested in sustainable agriculture, water quality, habitat conservation, and food systems issues.

Center Research Briefs are available free by contacting CASFS, 1156 High St., Santa Cruz, CA 95064, or mtbrown@ucsc.edu. They are also available in PDF format on the Center’s web site, www.ucsc.edu/casfs. If you would like to be added to an email list for publication announcements, please send your email address to mtbrown@ucsc.edu.

marginal, they cannot provide the funding that traditional university clients usually do.

Making the situation more precarious for serving the public agenda is that public research funding for social sciences is small and diminishing. Between 1973 and 1996, the small amount of funding going toward the social sciences in the U.S. dropped by 40 percent, from 8.0 percent in 1973 to 4.8 percent in 1996 of total federal/nonfederal funding sources (Rapoport 1998). This is particularly true in agrifood system research. For example, in 1987 only one percent of USDA research funds was spent on projects in sociology or anthropology (National Science Foundation 1989). Support for social science research in agriculture declined further between the 1980s and the 1990s (U.S. Department of Agriculture 1993). USDA recognizes that the problems facing rural America are largely due to social, economic, and cultural conditions and, as such, “cannot successfully be addressed solely with the knowledge generated by the biological or agricultural sciences” (U.S. Department of Agriculture 1993: 48). However, this has not translated into funding for social issues research.

In not only traditional but also sustainable agriculture grant programs, the emphasis is overwhelmingly on production and environmental topics (Allen 2004). The small amount of funding dedicated to research on non-agronomic topics is often limited to topics such as evaluating how farmers’ values and attitudes encourage or block adoption of sustainable technologies, and developing new marketing strategies for farm products. While there is some funding available for marketing and cost-of-production studies, the domains of standard agricultural economics, funding for social issues research, such as gender, working conditions, and food security is limited or nonexistent.

WALKING THE ACADEMIC-ACTIVIST TIGHTROPE

A challenge we face at the Center is how to simultaneously meet academic and public service objectives. Legitimacy on the “outside” can compromise legitimacy on the “inside”, and visa versa. Research universities measure success by metrics such as the numbers of students served, articles and books published and cited, and dollars brought in for research projects. Nonformal education, social science research, interdisciplinary research, and participatory research and action are often not highly valued within this framework. Not only is it difficult to obtain the funding that this type of work requires, but the greater value placed on individual scholarship in most research universities undermines efforts by researchers trying to work in interdisciplinary teams (Macrae et al. 1989; Klenner and Vyse 1999) and with social movement organizations. We are fortunate that UC Santa Cruz values interdisciplinary work, but it can still be difficult to attract research funding for such efforts.

The other side of this is how to maintain academic rigor and honesty without undermining the movements we support. For example, while the Center supports the organic farming movement, we do not see it uncritically as a panacea. In fact, part of our research agenda addresses the efficacy

and environmental soundness of organic farming, while simultaneously working to develop more sustainable farming practices. Other work reflects on the class configurations of the organic foods market (Allen and Kovach 2000), or notes concerns with the increasingly popular farm-to-school programs (Allen and Guthman, in press).

We think it is possible and desirable for academics to be simultaneously supportive and critical, but are concerned that this approach may not always sit well with those working in already beleaguered social movements. Our intention is for our research to serve as “resources” to social movements, without having research priorities defined by the necessarily immediate and often somewhat narrow questions of those working to create social change “on the ground”. We also believe it is important that the “Achilles’ heels” within alternative agrifood movements are anticipated and studied by those supportive of their goals. In this way the movements will be less vulnerable to critical attacks.

MEETING THE CHALLENGE

The Center for Agroecology and Sustainable Food Systems has developed from a particular history and set of commitments that enables its work in sustainable agrifood systems. While it is a constant challenge to meet the needs of diverse audiences, maintain institutional legitimacy, and secure resources, Center staff and cooperators continue to make important contributions. Through our work with local growers and agencies on watershed and landscape management we are developing new methodologies and gaining the trust of groups who have sometimes been on opposite sides of environmental issues. Together with California NGOs and other faculty, we have developed an Activist Researcher Consortium to serve as a forum for joint education and research on social issues in the agrifood system. We work with local groups on food-system issues, including an analysis of local food shortfalls and the development of a community-based food network discussion and action group.

We believe that these types of multidisciplinary, real-world, action-oriented efforts comprise an appropriate and essential role for a public university. We welcome your perspectives and insights on how we can—given our particular institutional location and commitment—most effectively shape our research, education, and public service programs to help bring about an ecologically sound and socially just agrifood system.

— PATRICIA ALLEN

References

- Allen, Patricia. 2004. *Together at the table: Sustainability and sustenance in the American agrifood system*. University Park, PA: The Pennsylvania State University Press.
- Allen, P., ed. 1993. *Food for the future: Conditions and contradictions of sustainability*. New York: John Wiley.
- Allen, P., M. FitzSimmons, M. Goodman, and K. Warner. 2003. Shifting plates in the agrifood landscape:



Center researcher Marc Los Huertos studies the effect of farming and other land uses on water quality in Monterey Bay watersheds as part of an effort to help growers limit farming's impact on rivers, streams and wetlands in the region.

- The tectonics of alternative agrifood initiatives in California. *Journal of Rural Studies* 19 (1): 61-75.
- Allen, P., and M. Kovach. 2000. The capitalist composition of organic: The potential of markets in fulfilling the promise of organic agriculture. *Agriculture and Human Values* 17: 221-232.
- Auburn, J., Director, USDA SARE Program. 2002. Telephone interview, 28 October.
- Baarda, J. 2001. Critical need seen to broaden, invigorate current approach to cooperative research. *Rural Cooperatives* Mar/April 2001: 21-24.
- Bonvillian, W.B. 2002. Science at the crossroads. *FASEB Journal* 16: 915-921
- Bowman, D.A.J.S. 2001. Future eating and country keeping: what role has environmental history in the management of biodiversity. *Journal of Biogeography* 28:549-564.
- Fairclough, N. 1994. *Discourse and social change*. Cambridge: Polity Press.
- Fairclough, N. 2001. *Language and power*. 2d ed. Essex: Pearson Educational Limited.
- Francis, C. Liebein, G., Gliessman, S., Breland, T.A., Creamer, N., Harwood, R., Salomonsson, L., Helenius, J., Rickerl, D., Salvador, R., Wiedenhoef, M., Simmons, S., Allen, P., Altieri, M., Flora, C., and Pincelot, R. Forthcoming. Agroecology: The ecology of food systems. *Journal of Sustainable Agriculture*.
- King, A.W. 1993. Considerations of scale and hierarchy. In: *Ecological integrity and the management of ecosystems*. S. Woodley, J. Kay and G. Francis (eds.). St. Lucie Press.
- Klenner, W. and A. Vyse. 1999. Interdisciplinary research approaches to address complex forest management issues. *The Forestry Chronicle* 75:473-476
- Kloppenborg, J., Jr. 1991. Social theory and the de/reconstruction of agricultural science: Local knowledge for an alternative agriculture. *Rural Sociology* 56: 519-548.
- Lowrance, R., P.F. Hendrix, and E.P. Odum. 1985. A hierarchical approach to sustainable agriculture. *American Journal of Alternative Agriculture* 1:169-173.
- Lowrance, W. W. 1985. *Modern science and human values*. New York: Oxford University Press.
- O'Neill, R.V., D.L. DeAngelis, J.B. Waide and T.F.H. Allen. 1986. *A hierarchical concept of ecosystems*. Monographs in Population Biology #23. Princeton University Press.
- Macrae, R. J., S. B. Hill, J. Henning, and G. R. Mehuys. 1989. Agricultural science and sustainable agriculture: A review of the existing scientific barriers to sustainable food production and potential solutions. *Biological Agriculture & Horticulture* 6 (3):173-219.
- McCalla, A. 1978. The politics of the U.S. agricultural research establishment: A short analysis. *Policy Studies Journal* 4 (4).
- National Science Foundation. 1989. *Profiles—agricultural science: Human resources and funding*. NSF 89-319. Washington, DC.
- Rapoport, A.I., Directorate for Social, Behavioral, and Economic Sciences. 1998. How has the field mix of academic R&D changed? *Division of Science and Resources Studies Issue Brief*. National Science Foundation publication 99-309.
- Shennan, C. and C. A. Bode. 2002. Integrating wetland habitat with agriculture. In *The farm as a natural habitat*. Eds. Laura L. Jackson and Dana Jackson. Island Press.
- Swezey, Sean L. (ed.). 2000. *Organic apple production manual*. University of California, Division of Agriculture and Natural Resources Publication 3403. 72 p.
- U.S. Department of Agriculture. Cooperative State Research Service. 1993. *Dynamics of the research investment: Issues and trends in the agricultural research system*. July. Washington, DC.
- Villarejo, D. 1990. Environmental effects of living and working in agricultural areas of California: Social and economic factors. In *Health concerns of living and working in agricultural California*. Report of a Conference held at the University of California at Davis. Davis, CA: Center for Occupational and Environmental Health.
- Woodhill, J. and N. G. Roling. 1998. The second wing of the eagle: the human dimension in learning our way to more sustainable futures. Facilitating sustainable agriculture: participatory learning and adaptive management in times of environmental uncertainty. Roling, N.G., Wagemakers, M.A.E. (eds.) Cambridge University Press, Cambridge, UK (1998) 46-71.

Santa Cruz area events

► **UCSC Farm & Garden Harvest Festival**, Saturday, October 8, 11 am–5 pm, UCSC Farm. Don't miss our biggest event of the year! Enjoy great food, music, tours, talks, kids' event apple tasting, community booths, and farmstands at the UCSC Farm. \$5 general admission; free for members of the Friends of the Farm & Garden, and kids 12 and under.

For more information and directions, see www.ucsc.edu/casfs or call 831.459-3240.

► **UCSC Arboretum and California Native Plant Society Fall Plant Sale**, Saturday, October 8, 10 am–12 pm (members of both organizations); 12 pm–4 pm (general public), UCSC Arboretum. Lots of great perennials, including California natives, for fall planting.

For more information and directions, see www2.ucsc.edu/arboretum or call 831.427-2998.



California

► **Healthy Harvest Show**, September 30–October 2, San Jose, California. California Certified Organic Farmers (CCOF) will sponsor an organic pavilion at this trade show, which provides a unique opportunity to connect with California and national retailers. Jake Lewin of CCOF will give a seminar on "Successful Organic Products Retailing" as part of the event's educational conference. Call 805.646-4246 or see www.healthyharvest-show.com for more information.

► **Bioneers 16th Annual Conference**, October 14–16, Marin Center, San Rafael. This annual conference is a hub of practical solutions for restoring the earth and people. Many workshops and talks focus on farming, food justice, and food systems. A food and farming community reception takes place Saturday evening, October 15. For program details and registration information, see www.bioneers.org/conference/, email info@bioneers.org, or call toll free, 877.246-6337.

► **4th Annual Sustainable Agriculture Pest Control Advisor (PCA) Conference**, December 2–3, San Luis Obispo. This annual conference addresses a wide variety of issues and provides a forum for PCAs and farmers to expand their knowledge of sustainable agriculture. Attend to update your skills, learn about organic production, organic standards, and organic regulatory issues.

For more information and to receive registration information or to become a sponsor, email jake@ccof.org or call 831.423-2263, ext. 21. Sponsored by California Certified Organic Farmers (CCOF) and cosponsored by Cal Poly State University's Sustainable Agriculture Resource Consortium.

► **Facilitating Sustainable Agriculture: A National Sustainable Agriculture Education Conference**, January 24–25, 2006, Asilomar Conference Center, Pacific Grove. This conference on post-secondary education in sustainable agriculture is designed for faculty, staff, students and administrators

from two- and four-year colleges and universities. The Center for Agroecology and Sustainable Food Systems (the Center), in collaboration with the UC Davis College of Agriculture and Environmental Sciences and Student Farm, will convene this event. See page 8 for details.

► **26th Annual Ecological Farming Conference**, January 25–28, 2006, Asilomar Conference Center, Pacific Grove. The Ecological Farming Conference is one of the largest and oldest gatherings of organic farmers, marketers, activists, and sustainable consumers in the U.S. The 2006 theme is "Savoring Connections from Seed to Table."

The conference features more than 50 workshops on innovative farming techniques and sustainable food systems. Participants enjoy organic meals, a regional farm tour, seed swap, organic wine tasting, exhibitor marketplace, and special events.

For information call the Ecological Farming Association at 831.763-2111, or see www.eco-farm.org.