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the Cultivar

The CENTER for AGROECOLOGY & SUSTAINABLE FOOD SYSTEMS

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in this issue:

CAN Encourages Sustainable Farming, Community Self Reliance

Members of a family from the Costa Rican community of Agua Buena, home to the Coopabuena coffee cooperative.

Each morning when I turn on my coffee maker, I make a direct connection with coffee growers in the Costa Rican community of Agua Buena. In a unique marketing arrangement these small-scale farmers mail the coffee beans they grow and roast directly to my home in Santa Cruz each month, and to other subscribers throughout the U.S. All of the money from coffee sales goes back to the growers through the farmers' Coopabuena coffee cooperative, which also supports conservation and education programs. In the cooperative's words, "Behind the coffee we offer there is a farmer, a family, and a community united by a pledge to preserve the heritage of the rainforest."

Agua Buena's direct sales program is one outgrowth of the Community Agroecology Network (CAN). Founded in 2001 by the husband-and-wife team of UC Santa Cruz Environmental Studies professor Steve Gliessman and environmental educator Robbie Jaffe, CAN's goal is to help rural communities in Mexico and Central America develop self-sufficiency and sustainable farming practices.

With much of CAN's work focused on coffee-growing communities, the non-profit group faces a stark challenge. Due to the rollback of production quotas and the subsequent surge in coffee planting, coffee prices have dropped nearly fifty percent in the last several years, leaving 25 million small-scale coffee producers worldwide in poverty. Says Jaffe, "People in countries like Nicaragua are literally starving to death because of the coffee crisis." Growers are tearing out their coffee trees and converting the land to less sustainable uses such as pasture and chemical-intensive crops such as bananas and tomatoes. Others are leaving their communities to seek work in the cities, or traveling to the U.S. and Canada in search of jobs.

CAN hopes to counter this trend by supporting community members' efforts to become economically viable, while at the same time protecting and improving the environment. CAN's work combines farm-based, farmer-motivated research, community education, and farmer-controlled markets that link directly with consumers, as well as consumer education. "We want to take advantage of the whole concept of the global

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"SUSTAINABILITY IS THE ESSENTIAL GOAL, AND THE APPROACH IS VIA AGROECOLOGY"

The Community Agroecology Network logo symbolizes the connections between southern coffee producers and northern consumers.

village and put the producer, rather than the corporations, in charge," says Jaffe.

DEVELOPING A NETWORK BASED ON AGROECOLOGY

The idea for CAN evolved during Gliessman and Jaffe's sabbatical year in Mexico and Central America. They were initially impressed by the work of a former UCSC graduate student at U Yits Ka'an, an ecological agriculture school in Mani on the Yucatan peninsula. Farmers from various Mayan pueblos come there for education in their traditional culture and and training in sustainable agriculture practices.

From the Yucatan they went on to visit former and current graduate students and associates working in small-scale coffee-growing communities in Mexico, Costa Rica, and El Salvador. In their travels, a common thread emerged—all of their colleagues were working toward helping the communities attain both economic and ecological viability, "Yet each of them was working in isolation," says Jaffe. "At the same time, we were becoming aware of the developing coffee crisis and were thrown into its issues and challenges. Making the connection between growers and consumers seemed like a natural pathway to address some of these issues."

Gliessman and Jaffe returned from their sabbatical with the idea of linking the disparate villages to each other and to consumers in a network that would take advantage of each community's strength. From that vision a three-pronged effort has developed that includes—

1. Participatory research within the communities: Doing on-farm research designed to meet the questions that farmers have and involve the farmer as part of the research process.
2. Education on multiple levels: Creating training programs to help the farmers move toward more sustainable practices, and an ongoing exchange and participation among the member communities.
3. Marketing the community's products: Improving livelihoods and linking marketing with sustainable practices as a motivation for growers, e.g., by encouraging organic growing.

As Gliessman explains, agroecology unites these efforts: "Sustainability is the essential goal, and the approach is via agroecology. Agroecology is a way for communities to build livelihoods that integrate conservation with a way of making a living—one goes hand in hand with the other," he says.

The researchers studying the agroecology of the communities add a unique element to the network. "These folks are immersed in the communities they work with," says Gliessman. "They're collaborative actors and their research takes on a different focus when they're part of the process. They're learning about how the farming system and social system work in a context that makes the information directly useful to those living in the community."

THE CAN COMMUNITIES

Huatusco

Huatusco, in the Mexican state of Vera Cruz, has an ideal coffee-growing climate and a coffee-dependent economy. Falling prices have pushed many small-scale coffee growers toward less environmentally sustainable crops; others are leaving the village at a rate of 30 to 40 a month. "These are very poor communities that have absolutely nothing and have been hurt badly by the coffee crisis," says Jaffe.

Researchers Laura Trujillo and Carlos Guadarrama (both with PhDs from UCSC's Environmental Studies Department) hope to keep Huatusco's growers on the land and provide a viable market for their products. Part of the challenge is developing awareness amongst the growers that they can produce a quality product. Jaffe notes wryly, "You ask the people in Huatusco, 'Where do you think the good coffee comes from?' and they say 'Colombia'."

Children from the village of Huatusco are benefitting from CAN members' work with women in the community.

Robbie Jaffe

"THEY'RE LEARNING ABOUT HOW THE FARMING SYSTEM AND SOCIAL SYSTEM WORK IN A CONTEXT THAT MAKES THE INFORMATION DIRECTLY USEFUL TO THOSE LIVING IN THE COMMUNITY"

Robbie Jaffe

Steve Gliessman teaches a gardening laboratory session for Mayan students at the Mani school.

Some of these growers have become "organic" by necessity—they can no longer afford agricultural chemicals such as fertilizers and pesticides. Trujillo and Guadarrama are teaching growers organic techniques such as composting to improve soil fertility and crop performance with the hope that they'll permanently adopt such practices.

Trujillo focuses much of her work on helping women in the community. "I'm currently working to organize a grassroots NGO with women that grow coffee, most of whom are coffee growers' wives," she says. She has helped arrange workshops and teach skills such as composting and farming medicinal plants. "This is a way for women to earn money to fund their own projects, such as an agroecological school where children can learn not only about ecology but also new approaches to education."

Guadarrama is currently working to find funds for the growers to purchase an industrial dry coffee processor to separate different quality coffee beans. Eventually, Guadarrama and Trujillo hope to create a market for their community's green coffee beans with roasters in the U.S.

Mani

Located near the center of the Yucatan peninsula, the pueblo of Mani is the site of U Yits Ka'an ("mist from heaven" in Mayan). Farmers from throughout the peninsula attend this ecological agriculture school to learn more about their own culture and about sustainable agriculture techniques. Juan Jose Jimenez-Osornio, who received a Masters in Biology at UCSC before completing a PhD in botany at UC Riverside, has worked closely with the development of the school's curriculum.

CAN supports the school's work of improving traditional agriculture efforts such as bee keeping and livestock raising. Explains Jaffe, "This school was one of the best efforts I've ever seen in terms of education and social change because its goal was not to move people out of their communities to get jobs in the cities, but to make the communities economically and ecologically sustainable."

Tacuba

The mountainous region of western El Salvador supports a network of rainforests rich in plant and animal life. Coffee growers in the community of Tacuba enlist this native plant diversity in the form of shade trees to produce high quality shade-grown coffee.

For the past four years, UCSC Environemental Studies graduate student Ernesto Méndez has worked with growers from three coffee cooperatives in Tacuba. His activities have focused on participatory research related to achieving both conservation and farmer livelihood goals in the cooperative's plantations. Specifically, he is examining alternative options, such as improved marketing and compensation for environmental services, that might lead to conserving native tree biodiversity in the plantations.

This type of participatory action-research approach has become a model for other CAN researchers. Méndez has set up regional seminars where growers and researchers from the three cooperatives share their knowledge on issues such as soil sampling and analysis, organic composting, and marketing strategies.

One outgrowth of Méndez's work is a new sister nonprofit of CAN, the Asociación de Investigación Interdisciplinaria para el Desarrollo Local y la Conservación (ASINDEC), developed to promote social, economic, and ecological research in the Tacuba area. The project's work focuses on two

> *continues on page 18*

Robbie Jaffe

Ernesto Méndez (center) and Steve Gliessman visit with a grower on his shade-grown coffee farm in Tacuba, El Salvador.

from the director

Communities and consumers are at the heart of a new effort to encourage environmentally sound agricultural practices. This issue's cover article describes the Community Agroecology Network (CAN), initiated by the Center's founding director Steve Gliessman and environmental educator Robbie Jaffe. A network of former and current UC Santa Cruz Environmental Studies graduate students in Mexico and Central America is doing on-farm research that addresses farmers' questions about how to improve their growing practices and markets while protecting the environment. In the U.S., CAN is showing consumers how their purchasing power can affect the long-term ecological sustainability of farmland and the livelihoods of small-scale coffee producers.

This issue also examines two different aspects of strawberries, one of the key economic crops on California's central coast. A project headed by UCSC researcher Joji Muramoto is currently looking at various crop rotation strategies to determine their impact on disease levels, crop performance, and nitrogen use (*page 5*). At the same time as organic strawberry production is growing more popular, conventional strawberry producers are facing the loss of methyl bromide, one of the critical components of their disease and weed control arsenal. UCSC sociology graduate student Brian Gareau received a Center research grant to help fund his study of the politics of the methyl bromide phase-out at local, national, and global levels, and how the phase-out may affect small-scale central coast producers (*page 7*).

Issues of scale are becoming more prevalent in organic agriculture as larger growers and processors enter the industry. Phil Howard, a member of the Center's social issues research group, critiques the growing consolidation of food producers and distributors in an article that appears in the California Certified Organic Farmers' newsletter (*page 10*).

In contrast, interest in supporting local producers has prompted a number of alternatives to the conventional food system, including Community Supported Agriculture (CSA) projects, farmers' markets, and "buy local" campaigns. On page 17, Center social issues researcher Jan Perez reviews *Bringing the Food Economy Home*, a new publication that examines ways getting food closer to home can address some of the problems with the current food system.

Finally, Alan Chadwick Garden manager Orin Martin shares his knowledge of growing beans in the home garden (*page 11*). May the vision of a teepee of flowering scarlet runner beans buzzing with bees and hummingbirds bring pleasure to your winter reading.

- Dr. Carol Shennan

the Cultivar

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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.

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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:

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Organic Strawberry/Vegetable Rotation Study Monitors Agroecosystem Health

Organic strawberry and vegetable growers on California's central coast face two major production challenges: managing soil-borne diseases without the use of chemical fumigants, and providing crops with optimum fertility while protecting water quality in sensitive habitats.

Currently, organic strawberry growers rotate the crop off of land for up to five years in order to avoid buildup of soil diseases such as verticillium wilt (caused by the fungus *Verticillium dahliae*). This long rotation period forces growers to constantly look for "new" strawberry ground or leave ground fallow, and limits their ability to increase production of this high-value crop.

Strawberries and other crops also require optimum soil fertility throughout the growing season to maximize production. Although composts and cover crops improve soil quality and provide nutrients, some organic growers supplement these inputs with commercial forms of organic fertilizers to meet strawberry and vegetable crops' late-season demands for nitrogen. Often these relatively soluble nutrients leach from the root zone, leading to surface stream and groundwater pollution on the central coast.[1] Overuse of compost and cover crops can also lead to nutrient loss.

In 2001, with the help of a Center research award, UCSC researcher Joji Muramoto, Center faculty affiliate Steve Gliessman, and Steve Koike of UC Cooperative Extension began working with landowner Robert Stephens and strawberry grower Daniel Schmida to study a five-year organic strawberry/vegetable rotation at Stephens' Elkhorn Ranch. This work followed three years during which the research team characterized the soil and monitored soil health indicators (levels of *V. dahliae*, nitrogen, and phosphorus) while the land was undergoing conversion to organic management.

Goals of the strawberry/vegetable crop rotation study include finding ways to shorten the period between strawberry crops while maintaining disease-free soil, and optimizing the use of fertility inputs to ensure that crops receive enough nutrients to produce well while minimizing leaching and nutrient runoff. Here we report on results from the study's first two years.

STUDY DESIGN

Working on a 1-acre plot of certified organic land at Elkhorn Ranch in Moss Landing (Monterey County), the study team established four treatments: continuous strawberries with applications of broccoli residues between crops; and strawberries followed by a cover crop that includes mustards, and either 1, 2, or 3 seasons of broccoli and spinach crops prior to another strawberry planting. The control is a 4-year period of vegetables and cover crops, with strawberries to be planted in the fifth year (see table 1, below). Treatments were arranged in a randomized, complete block design, with four replicates of each treatment.

To test management of soil borne diseases, the researchers are combining several ecological practices. These include incorporating broccoli residues to "biofumigate" the soil (via the chemical breakdown products of broccoli) prior to planting strawberries; planting mixed cover crops that include mustard (also thought to work as a biofumigant); applying compost; using relatively disease-resistant strawberry varieties (no truly resistant varieties have yet been developed); and choosing vegetables such as spinach that do not host *Verticillium dahliae*.

To monitor nitrogen use, the study team measures the amount of nitrate-nitrogen (NO_3-N) leached from the top 12 inches (30 cm) of soil in the strawberry bed. Because of the region's Mediterranean climate, most rainfall occurs from November through April, when the shallow root systems of strawberry plants are not fully developed. The top 12 inches is considered the zone where plant roots can absorb N during this rainy period. Below that zone, nitrate is assumed to be lost from the cropping system and can potentially enter groundwater.

The amount of leaching was estimated from changes in soil inorganic nitrogen content in the top 12 inches and

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Table 1. Rotation treatments in 5-year study

Rotation Treatments			**Year 1**	**Year 2**	**Year 3**	**Year 4**	**Year 5**
Treatment	**2000**	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**
A. (0 year*+br. res.)	cv - - -	cv - - vg - - -	**st** --------	**st** --------	----------	**st** ------ --	**st** -----
B. (1 year*)	cv - - -	cv - - vg - - -	**st** --------	cv-sp-br-**st**	---------	cv--sp-br-	**st** -----
C. (2 years*)	cv - - -	cv - - vg - - -	cv-sp-br-	**st**-------cv	-sp-br-cv--sp-br-		**st**-----
D. (3 years*)	cv - - -	cv - - vg - - -	**st** --------	cv-sp-br-cv	-sp-br-cv--sp-br-		**st**-----
E. (4 years*)	cv - - -	cv - - vg - - -	cv-sp-br-cv-sp-br-cv		-spr-br-cv-sp-br-		**st**-----

*period between strawberry plantings
br. res. = broccoli residue applied before planting strawberries; cv = cover crops;
st = strawberries (2 different cultivars); sp = spinach; vg = vegetables other than broccoli and spinach (e.g., lettuce)

the plant nitrogen uptake during the rainy period. To show statistical variability, the team used the Monte-Carlo simulation method and expressed the results as a mean and 90% credible intervals (i.e., 90% of simulated results fell within the interval specified).

Throughout the five-year experiment, the research group is also monitoring soil and agroecosystem health indicators, which include the number of *V. dahliae* fungal propagules in the soil (an indicator of verticillium wilt potential), as well as available nutrient levels, crop yield, disease incidence, and production costs. Additionally, the research team plans to examine how shortening the rotation period between strawberry crops affects soil microbial diversity in the project's later years.

RESULTS FROM YEARS 1 AND 2

Yields and Disease Levels

In the study's first two years the strawberries and vegetables experienced no major disease problems, with strawberry yields comparable to the local average for organic plantings. However, in treatment A (continuous strawberries), the numbers of fruit produced and the crop biomass declined in the study's second year, which may indicate a "sublethal" effect of accumulated soil-borne disease organisms that impact strawberry plant health. Soil monitoring showed generally low counts of *V. dahliae* in the first two years, with a slight increasing trend in the second year.

Over time, the researchers expect to see greater differences in yields and disease levels among treatments. This may include lower fruit yields and higher disease levels in the treatments with short rotations between strawberry crops. Based on the results from the next several years, the group will evaluate how much the rotation period can be reduced without building up soil pathogens and sacrificing yields and soil microbial diversity.

Nutrient Use and Leaching

In the first year, the grower applied his regular rate of compost and organic fertilizer (157 pounds per acre [140 kg N/ha]) in addition to broccoli residues. Strawberries were transplanted in November 2002 and a plastic mulch was applied in January 2003 after 11.8 inches (300 millimeters) of rain had fallen. Approximately 224 pounds per acre (200 kg/ha) of nitrogen were lost through leaching from the root zone during the entire rainy season (figure 1a).

Based on these results, the grower modified his N fertility management for the following year. He applied a plastic mulch prior to the rainy season and reduced the rate of N organic fertilizer applied pre-planting. Consequently, the amount of leached N was reduced to 39 pounds per acre (35 kg/ha) in the study's second year (figure 1b). Note that the residual inorganic nitrogen was much lower in the second year than the first year, suggesting the importance of testing for residual nitrogen in organic fields.

Funding for the Elkhorn Ranch project was provided by the North American Strawberry Growers Association, the Center for Agroecology and Sustainable Food Systems, the Halliday Foundation, and the Alfred E. Heller Chair in Agroecology at UC Santa Cruz. A grant from the Organic Farming Research Foundation will help support the project in 2004.

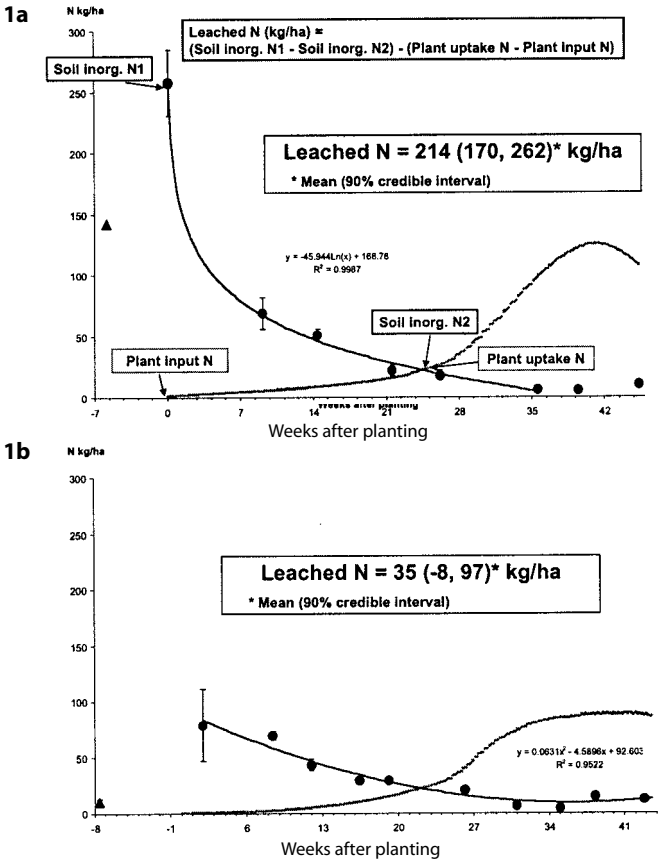
NITRATE RESEARCH AT THE UCSC FARM

In a related study, Muramoto is also monitoring nitrate leaching in an organic strawberry planting at the Center's on-campus farm. In October 2002, 18 tons per acre of compost were applied to the site; strawberries were transplanted in November. The planted beds were covered with a plastic mulch in January 2003 following several storms.

Using the same method described above, Muramoto measured nitrate leaching during the 2002–2003 rainy season. Although leaching levels were much lower than those measured in 2001–2002 at the Elkhorn Ranch site, the results indicated that a significant amount of nitrogen (101 lbs/acre, 90 kg/ha) was lost through leaching, in part because the site received heavy rains in December 2002, before plastic mulch was applied. As a result, Center farm manager Jim Leap applied plastic mulch to the beds earlier in the 2003–2004 season, before the heavy rains began. Leap and Muramoto will study the effect of using this earlier mulch application on nitrate leaching during the rainy season.

– Martha Brown

[1]Los Huertos, M., L. Gentry, and C. Shennan. 2003. Land use and water quality on California's central coast: Nutrient levels in coastal waterways. Center Research Brief #2, Center for Agroecology and Sustainable Food Systems.



Losses of soil nitrogen through leaching from Treatment A (continuous strawberries) in years 1 (figure 1a) and 2 (figure 1b) of the study.

Study Examines Politics of Methyl Bromide at Local and Global Levels

Methyl bromide is a soil fumigant used to control soil borne diseases and weeds, and is a key component of most conventional strawberry production in California. Like chlorofluorocarbons (CFCs), methyl bromide is also one of the chemical agents responsible for the hole in the ozone layer. In 1987, in response to a combination of continuing ozone depletion and public pressure, representatives from developed nations initiated a phase-out of CFCs and Halon use as part of an international agreement known as the Montreal Protocol. In 1992, methyl bromide was incorporated into the protocol's mandates as a result of the Copenhagen Agreement.

Brian Gareau, a graduate student in UC Santa Cruz's Department of Sociology, is interested in the reaction of strawberry growers to the phase-out process at local, regional, and global scales, and in the effect of California political forces on this type of environmental policy. In 2002, he received a Center research grant to support his study of the global politics of methyl bromide and the impact of the phase-out on local strawberry growers.

In reporting his findings from 2002–2003, Gareau provides some background as to why methyl bromide and CFCs are still in use. He notes the industry argument that "lack of viable alternatives to these substances would put industries in developed nations at an economic disadvantage with the rest of the world." In addition, due to a lack of economic incentives, large agro-industrial companies have put little energy into developing less environmentally damaging substitutes for methyl bromide. Through a series of amendments to the Montreal Protocol, agricultural industries in developed countries have been able to delay methyl bromide's phase-out, which is now scheduled for 2005.

CENTRAL COAST IMPACTS

As part of his research, Gareau looked first at the current status of strawberry agriculture conducted by the often-marginalized small-scale Mexican growers on California's central coast. He was particularly interested in whether Mexican growers were preparing for the phase-out process, where they were getting their information on alternatives to methyl bromide, and how their operations and workers would survive losing this input as a management tool. He drew his data from farmer interviews conducted by Environmental Studies graduate student Tara Pisani Gareau.

Gareau's preliminary findings show that Mexican growers who use a Pest Control Advisor as their primary information source plan to switch to a chemical substitute such as Telone once methyl bromide is no longer available. According to Gareau, "the Pest Control Advisor appears to act as a sort of "foster parent," providing guidance to the growers, but guidance that leads only to chemical alternatives."

In contrast, the majority of growers rely on family members' knowledge, local meetings, pamphlets from the University of California, and strawberry lender-shippers for information. These growers are uncertain, indifferent, or have no strategy for reacting to the methyl bromide phase-out. Many were unaware of both the phase-out and potential sources of help; only one of the 23 growers interviewed mentioned the California Strawberry Commission as an information source.

Although Telone is the most likely chemical substitute for methyl bromide, Gareau notes that it too has dangerous side effects. "Telone is known to persist in groundwater supplies, is a probable carcinogen, and has been found to be toxic to bird and fish species," he reports. It is also unlikely to produce the yields that methyl bromide provides, and given

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Jered Lawson

Some small-scale growers like Efrén Avalos of AMO Organics, a grower cooperative in the Salinas Valley, are already producing strawberries without methyl bromide.

"THERE IS NO CLEAR LINE BETWEEN "OBJECTIVE" SCIENCE AND POLITICO-ECONOMIC CONDITIONS"

its environmental effects, may be subject to use limits in California. As Gareau concludes, if Telone's use is restricted, it is uncertain which group of small-scale Mexican strawberry growers will survive: those who have decided on chemical alternatives to methyl bromide, or those who are undecided and could potentially adopt organic alternatives that might improve their chances of survival by producing a high-value crop. However, making the transition to organic growing involves its own challenges. Since organic production often entails crop rotations, growers may need access to additional capital and land and may need to learn to market and grow other crops as part of the rotation process.

DELAYING THE PHASE-OUT'S IMPLEMENTATION

Gareau is also interested in the industry, state, and global reactions to the Montreal Protocol, and the efforts by certain countries that have ratified the protocol to delay the phase-out's implementation or seek Critical Use Exemptions (CUEs). Such exemptions would allow growers to continue using methyl bromide in some situations. In July 2003 he traveled to Montreal to observe the Open-ended Working Group of the Meetings of the Parties to the Montreal Protocol, where countries had an opportunity to propose amendments to the protocol, including delays and use exemptions.

Despite recommendations by the protocol group's own Agricultural Economics Task Force that alternatives to methyl bromide exist, that the cost of eliminating methyl bromide will decrease over time, and that the phase-out should be finalized by 2005, a number of countries continue to seek exemptions. This includes primarily Australia, Canada, and the U.S. Of the 16,000 metric tons for which Critical Use Nominations (CUNs) were made, nearly 25% was requested for strawberry production, the majority by the U.S. strawberry industry.

Gareau reports that those countries seeking to continue the use of methyl bromide beyond the 2005 cut-off date argue that effective alternatives have not yet been developed, or those chemical alternatives that do exist may not be effective in some climate or soil situations. For instance, the California Strawberry Commission claims that exemptions are necessary in strawberry production because, "alternatives do not work well on hillsides and heavily sloped fields."

As he notes in his report's conclusion, the continuing arguments over whether or not to grant exemptions for methyl bromide's use—despite evidence of alternatives—". . . depicts the effects that political interests can have on scientific outcomes. There is no clear line between 'objective' science and politico-economic conditions. Indeed, the two are intermingled in a mangle of contested practice and scrutiny." With the debate ongoing, it is not yet clear whether methyl bromide will indeed be phased out by 2005 as scheduled.

Strawberry fields are treated with methyl bromide prior to planting to eliminate weeds and soil pathogens.

Gareau also found that Mexican strawberry growers lack direct representation at the global arena level of the methyl bromide debate. "This is a significant finding," he says, especially given that the California Strawberry Commission's argument for prolonging methyl bromide's use is based in part on conditions—hillsides and heavily sloped fields, as noted above—that Mexican growers often face, as these lands are considered less-valuable strawberry acreages and are often leased or owned by Mexican growers.

RESEARCH PLANS

In 2004 Gareau plans to continue his examination of the global politics of the methyl bromide controversy. "The concept that scientific knowledge is embedded in the decision-making of powerful political, social and economic actors is, in itself, not new . . . yet, how this process plays out and affects California strawberry production is new," he says "I propose to continue my research that coincides with the Center's mission to "increase understanding of the social, economic, political and ethical foundations of agricultural sustainability" by interrogating further the role played by actors at the global level. I believe that this "global ethnographic" aspect of my research project on California strawberry production is of key importance in discovering how local actors can further the struggle of obtaining sustainable agricultural systems."

– Martha Brown

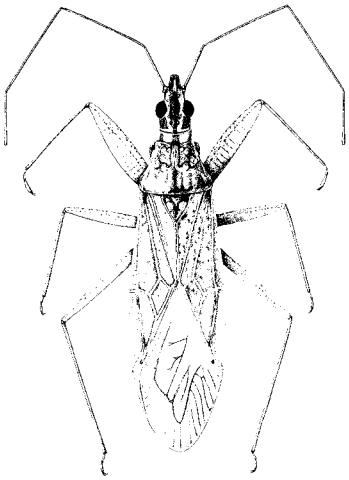
Study of Beneficials and Pests in Hedgerows Continues

On-farm revegetation with native perennial hedgerows can help control soil erosion and runoff, as well as provide habitat for beneficial insects. In an ongoing study initiated in fall 2002, Center researchers Janet Bryer and Diego Nieto are monitoring insect populations in hedgerows, focusing on four native plant species: *Achillea millefolium* (yarrow), *Baccharis pilularis* (coyote brush), *Ceanothus* sp. (California lilac), and *Eriogonum* sp. (buckwheat).

Research questions being addressed in the study include: Which natural enemies are attracted to the native plant hedgerows? In what season are they most abundant? Do the hedgerows attract potential pest species as well as beneficials? The study is funded by a grant from the State Water Resources Control Board in collaboration with the Community Alliance with Family Farmers.

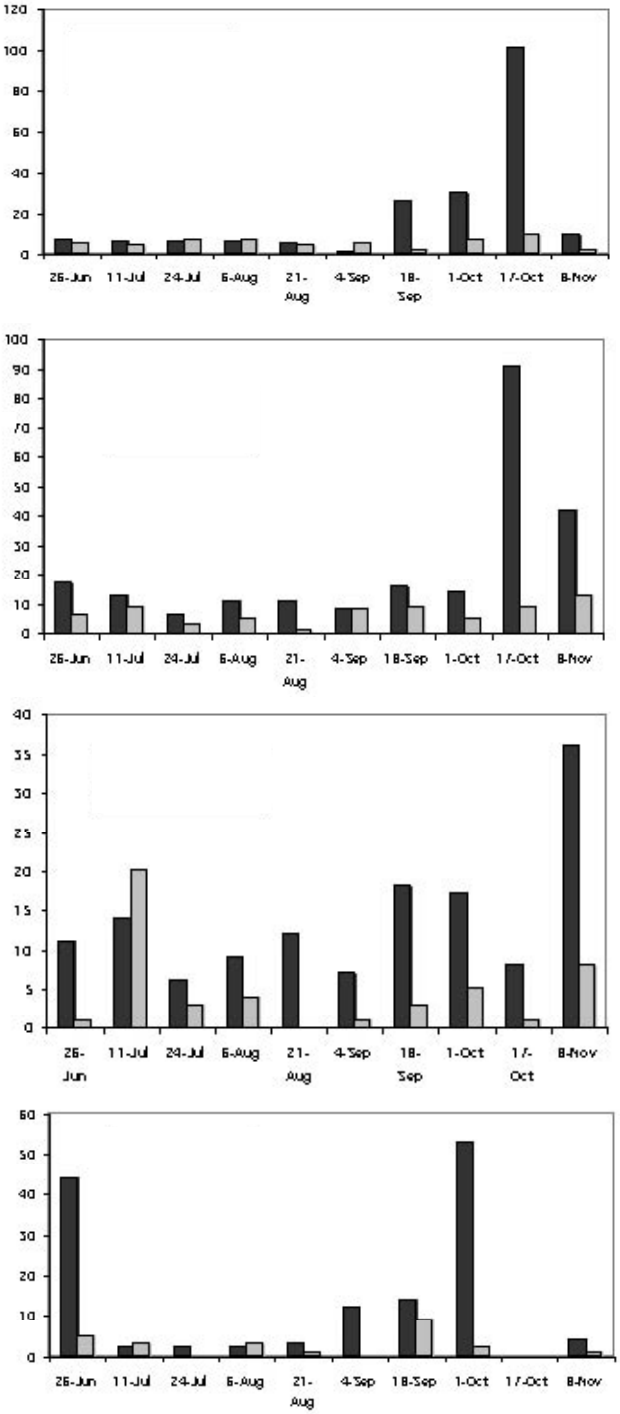
Data collected from June through November of 2003 at the Dutra, High Ground Organics, Gizdich, and Garroutte farms in the Pajaro Valley show that the perennial hedgerows are attracting more total beneficial insects than total herbivores (potential pest species). For example, the figures at right show the total numbers of beneficials and herbivores collected from the hedgerow plant *Baccharis pilularis* at the four farms throughout the season.

Monitoring of the sites will take place for another season beginning in the spring of 2004. Following the monitoring, the researchers will conduct an in-depth analysis of the data to determine the efficacy of using perennial hedgerows as a pest management tool.



Diana Marques

Beneficial insects collected from the hedgerows include damsel bugs (*Nabis* sp.). These generalist predators prey mainly on soft-bodied pest species such as aphids and lygus bugs. (Actual body length = appr. 1/3 in.)



Total numbers of beneficial (dark bars) and herbivore (light bars) species collected from *Baccharis pilularis* at (from top) Dutra, High Ground, Gizdich, and Garroutte farms, June–November 2003.

Feature in CCOF Newsletter Discusses Consolidation in Organic Industry

A feature article discussing consolidation in the organic food industry, written by Center post-doctoral researcher Phil Howard, appears in the Winter 2003–2004 issue (Volume 21, Number 4) of the California Certified Organic Farmers' *CCOF Magazine*. Howard discusses the implications for farmers and consumers of the increasing consolidation in the food system, including the organic sector. This includes fewer choices for consumers, loss of direct dealing between store managers and local farmers, and introduction of genetically engineered foods into the food system without public consent, or even public knowledge.

In the article, Howard outlines how consolidation occurs, as companies use horizontal and vertical integration, and global expansion to control the food system chain and increase their market share worldwide. "Organic agriculture is not immune to these trends," writes Howard. "Many organic brands have been acquired by giant food processors such as General Mills, Kraft (Philip Morris) and Kellogg." Consolidation in food retailing and fast-growing natural foods chains such as Wild Oats and Trader Joe's may also work against the small-scale grower, writes Howard, because ". . . these corporations prefer to deal with operations that can supply huge volumes for their increasingly centralized supply chains.

Howard also describes some of the alternative agriculture movements that can challenge corporate dominance and offer consumers more sustainable options. These include direct marketing via Community Supported Agriculture (CSA) projects, roadside stands, and farmers' markets. "Other emerging alternatives include farmer marketing cooperatives with retail brands (such as Organic Valley), and "eco-labels" that represent ecological and social criteria that go "beyond organic"," writes Howard. Such labels include fair trade, humane, and region-specific.

Consolidation in Food and Agriculture: Implications for Farmers and Consumers, can be read on-line at the CCOF web site, www.ccof.org. For a copy of the magazine, contact CCOF at 831.423-2263, ccof@ccof.org.

Keith Warner

Farmers' markets offer an alternative to corporate consolidation in the food industry. Here Judith Redmond sells produce from Full Belly Farms at the Davis Farmers' Market.

Water Quality Monitoring Project Completes Third Year

Water quality monitoring work continued for a third year in 2003 as Center researchers measured nitrate and phosphorous levels in the Pajaro River and Elkhorn Slough watersheds. A part of the Central Coast Research Project funded by the US Department of Agriculture, this effort analyzes the impact of farming and other land uses on water quality in coastal watersheds. Center director Carol Shennan coordinates the research, which includes collaboration with UCSC Earth and Marine Sciences professor Andy Fisher and a number of government and non-governmental organizations in the Monterey Bay region.

As in the previous two seasons, the research team of Marc Los Huertos, Lowell Gentry, and Claire Phillips monitored streams and agricultural ditches throughout the watershed. According to Los Huertos, trends in nutrient and phosphorous levels were similar to those in 2001 and 2002, with the highest levels present in areas of agricultural activity. Areas with high water tables also exhibited high levels of nutrients.

"This may be a result of nutrients moving laterally with the water to enter surface waters," says Los Huertos. The researchers are now developing strategies with growers working in areas of high water tables to address elevated nutrient concentrations.

In 2003 the group also analyzed chlorophyll levels in the water columns of the streams being monitored. The conventional wisdom is that high nitrate and phosphorous levels trigger the growth or "bloom" of algae; therefore, the researchers expected to see higher chlorophyll levels in areas of high nutrient concentrations.

"Surprisingly, it was much more variable than we expected—we didn't find a direct correlation between high nutrient levels and high chlorophyll levels," says Los Huertos. "Chlorophyll may in fact be more affected by what's upstream of the monitoring site. For example, a riparian area upstream may play a more complicated role in algae growth and death, leading to these variable patterns of chlorophyll concentration." Also, most work on algal blooms has been done in lakes; algae growing in streams may experience a different dynamic.

As part of his work on water quality in farming systems, Los Huertos recently presented two courses to growers in Gilroy and King City on watershed science. Sponsored by the UC Cooperative Extension program, these courses introduce row crop growers to watershed biology and hydrology, and how land management interacts with watershed processes.

Beans Offer Year-Round Source of Great Flavor, Nutrition

Garden beans (principally *Phaseolus vulgaris*) are tender, warm season annuals grown for their edible pods and seeds. The pods are eaten at the immature stage with minimal seed formation (green or snap beans). The seeds are eaten while still moist and succulent, but with the pods leathery and thus discarded (fresh shell beans). After maturing further many of the fresh shell varieties are harvested, stored, and cooked at the dry bean stage.

Beans are grouped in the Fabaceae family, the third largest plant family after the Orchidaceae and Asteraceae. Previously classified as the Leguminosae, the Fabaceae family consists of approximately 700 genera and 17,000 species. Additionally there are over 2,000 varieties of beans grown and catalogued worldwide. *Phaseolus* beans originated in both lowlands and highlands of Mexico through South America. There are records of beans being in cultivation as long as 9,000 years ago.

Ingenious and enterprising gardeners can have beans in the kitchen in one manner or another the year round: fresh snap beans from midsummer to fall; fresh shell beans from midsummer to fall; dried beans from fall to spring; and of course, as a reminder of summer, snap beans pickled throughout the year. All beans are an excellent source of vegetable protein and are rich in vitamins A and B as well as calcium, phosphorous, and iron.

GROWING TIPS

Planting conditions and germination. Because of their tropical origins, beans are tender, warm-season crops. They are directly sown when soil temperatures average greater than 60°F, with 70°–85°F an optimal range for germination. Cold, wet soils induce seed rot, reduce percentage of germination, and lengthen time to emergence. Continued cool air and soil temperatures will slow the growth of bean seedlings and cause chlorosis (yellowing); 70°–90°F is an ideal range for growth, pod set, and maturation.

Being a large-seeded crop, bean seeds are not overly sensitive to a soil dry down to 50% of field capacity between waterings before the seedling emerges. Because of the seed's ability to imbibe and hold water, the soil can feel frighteningly dry during this process.

Soils and planting. Depth of planting can vary from 1/2 to 1 1/2 inches, depending on soil texture and specific weather patterns at planting time. Lighter textural classes of soils (sands and silts) favor deeper planting; cool, wet weather favors shallow planting. It is important to remember that germination and seedling root growth require significant amounts of oxygen. Thus a soil that has been appropriately managed over time will display a good structural arrangement of soil particles and facilitate the diffusion of air into the soil (a passive process) and the exit of excess CO_2.

Beans are seeded with 6–9 seeds per foot and then thinned to 3–6 inches between plants. Spacing between rows is generally 20–36 inches for bush types and 4–5 feet for pole types. A soil pH of 6.0–6.8 is optimal for beans.

Weed management. Weed management (suppression via hoeing) should be practiced 1–2 times within 30 days of emergence. Both bush and climbing types possess moderately deep (1–2 feet and 3–4 feet respectively), branched tap root systems, and are good at outcompeting weeds as the crop advances.

Watering. Water requirements for beans are moderate, 1.5–2 inches per week until flowering. From flowering through harvest lack of water has a severe negative effect on flowering, fruit set, and quality of the pods. Thus a steady supply is recommended, especially with fillet beans.

Fertilizers. Beans are among the least responsive vegetable to fertilizer inputs. As legumes they can meet some of their nitrogen need by fixing soil atmospheric nitrogen (see below). Unless soil tests indicate a deficiency, neither phosphorous nor potassium need be applied.

Harvesting. Harvests must be consistent (every 2–5 days) and thorough. Like peas, squash, and many annual flowers, a few fruit left on the vine will truncate further production.

> *continues on next page*

Rhizobium bacteria

One of the remarkable features of most legumes is their ability to host symbiotic soil bacteria on root nodules. This association allows the bateria to take nitrogen gas from air in the soil and convert or "fix" it chemically into a form available to plants. The bacteria residing in the legume root nodules are called Rhizobia (*Rhizobium* spp.). Each species of legume hosts a specific species of the Rhizobium; that is, the species that associate with clovers won't inoculate beans. Growers with low levels of inoculum in the soil can increase the vigor and yield of bean plants by inoculating the seeds with the appropriate Rhizobium prior to planting.

TYPES OF BEANS

Green Beans/Snap Beans

Green beans or snap beans fall into two basic plant types—bush (determinate) and pole or climbers (indeterminate), and several different pod types—6–8-inch long round-podded, pencil thin and straight Blue Lake types; 8–10-inch long round, slightly curved Kentucky Wonder types; and 8–12-inch long flat, broad-podded Romano types. Within each type there are many colors, with shades of green, yellow, purple, speckled, or mottled.

Snap beans were formerly called string beans, referring to the string-like, tough tissue that developed along one edge of the pod and had to be removed by hand prior to cooking. Most modern varieties have had the "stringiness" bred out of them.

Breeding efforts over recent decades have been towards developing bush varieties with an erect, self-supporting habit, pods held well above the foliage, and a concentrated set of flowers and pods. Plant habit, texture, and taste are biased toward machine harvest and processed fruit. Thus home gardeners and fresh market producers need to be aware of and select for appropriate varieties.

Bush types mature in 50–70 days and crop for 2–3 weeks. Climbers take an additional 20 days to begin harvest and need support (sturdy 7–10-foot fencing) but crop for 2–3 months and sometimes even longer.

Romano Types

Romanos or Italian flat beans come in both bush and climbing types. While the taste of bush types is acceptable, the climbers offer much better texture and taste. Romanos are big (8–12 inches), flat-podded (3/4–7/8 inches), meaty, rich-flavored snap beans. In fact, full taste doesn't express itself until pods are greater than 6–8 inches long up to 12 inches. Romanos are the densest, full-flavored kings of fresh green beans. The climbers offer 2–3 months of cropping, with the first 2 months offering continuous, heavy cropping and diminishing yields, but still high flavor in the later period of harvest.

Romano Bush Varieties (in general bush varieties feature "floppy" plants)

Romanette (55 days) – Medium dark green beans, flat 6 x 3/4-inch pods that retain full flavor even when beans enlarge in pods. Plants more upright and sturdy than other bush Romano varieties.

Roma II (59 days) – 20-inch tall plants, medium green flat beans, smooth exterior. Roma II are good fresh and good for canning.

Green Crop (55 days) – Longer (8–10 inches), narrower pod than other bush types; excellent tender taste when fresh, good for canning.

Romano Gold (56 days) – Features attributes of Romanos with wax types combined with yellow, golden color. Smaller beans are 4 1/2–5 inches long. Pods held well above foliage. Light buttery yellow pods. Distinctive looks, productive and high flavor.

Romano Climbing (pole) Varieties

Musica (67 days) – Moderately vigorous 6–8-foot tall plants with good foliage: pod balance. Pods are 9–11-inches long, flat, and straight. High quality, high quantity—among the most productive and yet highest flavored of all Romanos.

Helda (60 days) – Early maturing 6–7-foot tall vines bearing 9–10-inch long flat pods. Romano stringless and succulent even at larger sizes. Productive over a 2–3 month period.

Neopolitan (70 days) – Improved Romano with high yields and uniformly long pods (9–11 inches). Sugary sweet flat pods with a rich, long-lasting taste.

Golden of Bacau – An old heirloom from Romania, with a high yield and long cropping period. Long (9–12 inch), flat, golden pods. Excellent taste even after beans have formed in pods.

Kentucky Wonder Types

Classic, original "string" beans with a much richer, fuller, meatier flavor than any modern snap bean. They bear profuse crops of 6–8-inch long, slightly curved oval pods of silvery green color. The staple bean of American pioneer homesteads. New improved types are snap beans with the stringiness bred out of them.

Kentucky Wonder Varieties

Kentucy Wonder (pole), Kentucky Blue (pole), and Kentucky Wonder Wax (yellow pole)

Blue Lake Types

Blue Lake varieties (bush and climbing) define the look, taste, and texture of summer's cornucopia in the snap bean domain. Blue Lake types are excellent raw, steamed, and as "dilly" canned beans. The bush types feature sturdy, erect 2–3-foot tall plants with pods set both concentrated and held distinctly above the foliage for easier harvest. The pods are round, pencil-shaped, long (6–8 inches) and perfectly straight. They are virtually fiber-free and "snappy" with a

Bush vs. Climbers

Bush types

- Mature quickly, 50–70 days
- Concentrated cropping period, 2–3 weeks
- Less effort and materials for fencing or trellising
- Increasingly greater varietal possibilities
- Require bending and stooping to harvest
- Lower overall yield
- Higher pod to vine ratio

Climbers

- Slower maturing, 60–75 days
- Extended cropping period, 2–3 months or longer
- Require extensive trellising
- Almost vanishing varietal possibilities
- Picker can stand tall and straight to harvest
- Significantly higher overall yield
- Lower pod to vine ratio

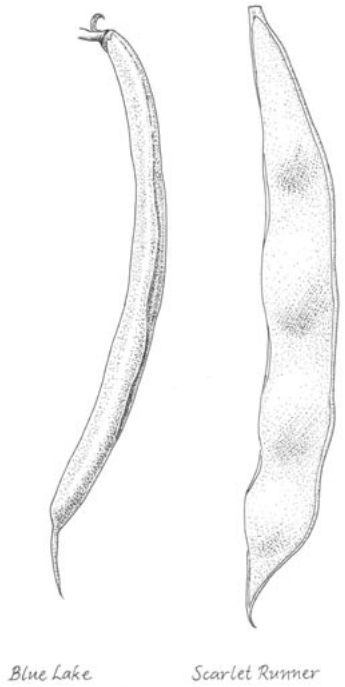
light, slightly sweet taste. *Caveat emptor* (buyer beware)—increasingly, bush Blue Lake varieties are being bred for even maturity (short cropping period of 57–60 days), machine harvest, and processing. Thus fresh taste is poor. There are yellow- and purple-podded varieties, and although good looking, the taste is often disappointing.

Blue Lake Bush Varieties

Strike (54 days) – Early maturation, extended harvest (3–4 weeks) for a bush type, good taste. Standard of Blue Lake types for over 20 years.

Blue Lake (55 days) (and Blue Lake 274) – Unique flavor, stringless, slow fiber and seed development, with dark green, round 6–8-inch long pods.

Grenoble (52 days) – Hey, if it's French and a bean, it must be extraordinary, and it is. Tasty 5–6-inch long pods, perfectly straight and a dark green luster. Short, concentrated harvest period (2 weeks).



Blue Lake beans (left) are the typical snap beans of mid summer. Scarlet runners produce abundant bright flowers and meaty, delicious beans.

Eliza Jewett

Provider (50 days) – Early harvest; 5-inch long pods are medium green, fleshy, and round, on compact, erect plants. Germinates in cool soils, performs well under adverse and diverse conditions. A tasty and reliable producer, thus keeping it on the market for 30 years.

Tenderpod (50 days) Early developer, long-time favorite. Deep green, meaty flavor, smallish 4–5-inch long round pods, good flavor, fresh and steamed.

Blue Lake Climbing Varieties

Blue Lake (70 days) – Straight, round, 6-inch long pods, stringless, crisp, tender and sweet even at maturity. Long harvest period (2–3 months). Far superior in taste to any bush Blue Lake variety.

Kentucky Blue (65 days) – Combines the straight pods, light taste, and stringless pods of the Blue Lakes with the rich, meaty, old time bean gusto of Kentucky Wonder types.

Fortex (60 days) – Rich taste, crunchy, snappy texture, extra long, round pods (10–12 inches). Very early for a climber. Picked at 6–7-inch stage, it is very much like a fillet bean.

Northeaster (56 days) – Vigorous vines, earliest pole bean, huge (8–12 inch) flat, buttery pods.

Bush Wax Beans

Bush wax beans are much like bush snap beans except they tend to be yellow with a distinct waxy exterior and a crunchy snap. These beans are good steamed but make the best pickled beans as they do not get soggy. They are at their best if harvested slightly before attaining full color.

Bush Wax Varieties

Roc d'or (50 days) – Classic, early, high class yellow wax beans are long (6–7 inches), slender, and golden yellow. Harvest young for best quality and taste.

Sunburst (51 days) – A good early wax bean. Tolerates cool, wet conditions.

Nugget (52 days) – Sturdy plants, short, straight, plump, bright yellow pods. Rich, buttery taste.

Gold Mine (53 days) – Best texture for canning.

Major (63 days) – Tender, yellow, waxy pods, high yields of 5–6-inch long straight pods. Seeds are slow to develop, thus extending the harvest period.

French Fillet Beans

French fillet beans (also called *haricots verts*) are a distinctive class of green-podded snap bush beans (*Phaseolus vulgaris*). They feature slender (1/8–1/4-inch diameter) stringless, low fiber beans. Fillet beans are light, buttery, and crisp at the same time. They can be used whole and raw, marinated, or steamed quickly (3–5 minutes) in salted boiling water. If presentation is an issue, they fit nicely on a plate whole.

To ensure flavorful succulence and justify their high market prices ($3–$6/pound) fillet beans must be grown in a moderate temperature range (75°–85°F), supplied constantly with water from the flowering stage on, picked every 36–48 hours (72 hours under cooler conditions), and picked at an immature stage (2–5 inches long).

Fillet bean plants are short (20–28 inches) and often hide their beans amidst the foliage—making thorough harvesting a hide-and-seek challenge. Also the plants are not as sturdy and erect as their snap bean counterparts.

The plants tend to flower and set their beans in concentrated waves. Even at that, the overall harvest period is short (10 days–3 weeks), and yield per plant is low (less than 1/2 pound/plant). Successive sowings every 10 days to 2 weeks will guarantee a steady harvest.

Some recent varietal developments permit a larger bean length (6–8 inches), longer interval between harvests, and greater heat tolerance.

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Fillet Bean Varieties

Nickel (53 days, open pollinated [O.P.]) – Tolerates both hot and cold temperatures better than most varieties. Stronger and more erect plants than other fillets. Plants reach 22–26 inches high, bearing dark green pods. Excellent eating quality.

Cupidon (55 days O.P.) – A prized English variety. Short plants (18–22 inches). High yields over a sustained period. Extremely flavorful.

Totem – French fillet type that has many of the same characteristics of bush snap beans: tall plants (36 inches), snappy slender pods 6–8 inches long, easy picking, slow to become leathery and tough.

Maxibel (60 days, O.P.) – The first fillet variety to retain all its positive qualities at a large size (1/4 x 8-inch long beans). Concentrated fruit set makes for easier harvests.

Cherie (52 days) – 4–5-inch long round, dark green pods, medium height plant (24–28 inches), excellent taste and texture.

Scarlet Runner Beans, *Phaseolus coccineus*

The scarlet runner bean has long been prized by the cultures of Northern Europe (Ireland, Germany, Great Britain, and Scandinavia). Gardeners in these climates, with their cool summers and restricted warm growing seasons, find it difficult to ripen pole varieties of *P. vulgaris*. Scarlet runners "come a cropper" in such areas. While associated with Northern Europe, they are native to the highlands of Central and South America, and were brought back to Europe by Cortez in the 1500s.

America thinks of the scarlet runner bean as merely a quick, annual screen with attractive flowers that draw hummingbirds. In reality, they are perennial and highly productive over a long season, and are among the sweetest, richest, and most exquisitely flavored of all beans.

The scarlet runner plant features a large, fleshy, almost tuberous rooted perennial crown, which develops during the first growing season. This 8 x 12-inch crown can be left in the ground and over-wintered in mild and/or dry climates. The dividend of this perennial bean is early plant establishment the second (and subsequent) seasons and early cropping (mid to late May–June). Additionally, scarlet runners have a greater tolerance for cool soil and air temperatures than any other bean. In cold climates the perennial rootstock can be lifted from the ground, over-wintered in a root cellar and replanted the following spring. In this fashion a seed-propagated plant can persist for at least 3 to 5 years.

Scarlet runners are remarkable in their vigor, often reaching 12–15 feet tall and necessitating a tall, sturdy trellis. The beans feature 8–12-inch long, flat, slightly irregular, fuzzy pods. Unlike snap or fillet beans, they do not achieve their full, sweet, rich, "meaty" flavor until the pods are at least 7–8 inches long.

The name scarlet runner has always been a mystery to me. The flowers are either a brilliant orange-red, or bi-colored (Painted Lady variety) orange-red standards with a white banner and keel. The beans are pink mottled with black and can be used as fresh shell beans or dried beans as well as eaten at the snap bean stage—quite a versatile performer.

Scarlet Runner Varieties

Scarlet Emperor (75 days) – Richest taste, more savory than all but the best Romano beans. Large extremely showy flowers, prolific producer (from June – 1st frosts) of plump, sweet, and savory pods.

Painted Lady (80 days) – Heirloom variety grown in English gardens since the early 1800s, 10–14 inches long rough but sweet pods on 8–10 foot vines. Pinkish brown seeds. Flowers are bi-colored orange-red and white.

Dwarf Bees (80 days) – A dwarf half runner variety. Plants are 24–36 inches tall with spikes of brilliant orange, showy blooms that attract hummingbirds and are highly edible. The pods are smaller, edible, and should be harvested young (4–6 inches long).

Fresh Shell Beans *(aka "Shelley"/Horticultural beans)*

These varieties are simply mature but not fully dried beans that are laboriously shelled by hand and are versatile in taste and texture. They mature sooner (in 70–90 days) than dried beans and can start contributing to mid-late summer dishes.

Fresh shell beans are often "precooked"— simmered in herb water with the sliced allium of your choice (up to 30 minutes or until tender) and then added to diverse dishes. It is critical to harvest when the pods are lumpy, indicating plump, moist beans inside, and the individual beans are still somewhat moist and succulent. The pods are tough and dry but still retain some of their original color.

Fresh shell beans have a very short season (10 days–3 weeks) before they pass on and become dried beans for the kitchen larder.

Fresh Shell Bean Varieties

French flagolet types

Flambeau (80–90 days) – The classic green-tinted bean of French cuisine. Used as a fresh bean as well as a dried bean. Tediously difficult to shell but well worth the effort. Small yield, small bean size.

Flagrano (76 days) – A vast improvement on Flambeau as it is much easier to shell by hand. Plump, mint green-colored seeds, high flavor.

Tongue of Fire (70 days) – One of the highest-flavored fresh shell types. Red-streaked pods 6–7 inches long can also be harvested very young as snap beans. Originally from Tierra del Fuego at the southern tip of South America.

Vermont Cranberry (75 days) – Bright red, mottled pods. Old time, early New England settlers' variety. Large, upright bush plants. Shelled beans are plump, mid sized, and streaked red and pink. Good as a dried bean but loses red color.

Dried Beans

Dried beans are selected varieties of *Phaseolus vulgaris* that are grown to full plant senescence. The individual fully mature, dry bean seeds are shelled from the dried leathery pods by shaking, beating, flailing, or hand shelling. If fully

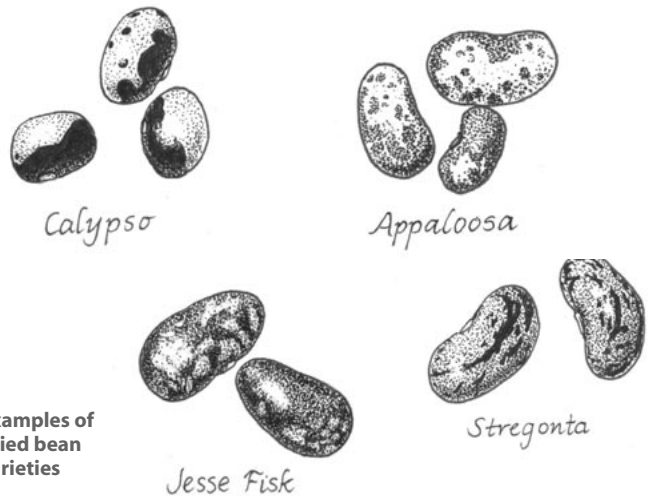
mature and stored under dry, cool conditions, they will retain optimal flavor for up to 9 months. Many varieties have a higher heat requirement than snap beans and a considerably longer time to maturation (90–130 days).

There are probably close to 1,000 varieties of dried beans grown worldwide. In addition to the amazing array of visual patterns and a diversity of tastes and textures, dried beans offer a cross-section profile of human trials, travails, and triumphs through 7,000–9,000 years of cultivation. They offer hints at cultural histories and a snapshot lesson in social-cultural anthropology.

Some examples –

Cannelini – A rich, meaty, white kidney-type bean that defines the famous Tuscan region of Italy's Minestrone soup. This bean evokes regional pride and chauvinism amongst Italians as the best bean on earth.

Eliza Jewett



Examples of dried bean varieties

Cherokee Trail of Tears – Carried by Native American Cherokee tribe members on their infamous death march from the Smoky Mountains to Oklahoma in the fall and winter of 1838-39. This brutal exodus left 4,000 graves in its wake. The variety was passed on to subsequent generations.

True Red Cranberry – Used as a staple by Abnaki Indians on their cook shack rafts, which floated down rivers during spring lumber drives in Maine and fed the participants.

Montezuma Red – The dried bean grown by Mexican native tribes when Cortez arrived.

Other dried bean varieties of note –

Appaloosa (Anasazi) – Named for the Native American civilization that thrived for 1,000 years in the Southwest and suddenly vanished. A slender, curved, oval bean with mottled purple-white markings; cooks to a pink, burgundy with a piney, herbaceous taste.

Calypso – Ying yang black-and-white colored heirloom that is closely related to Cannelini beans. Has a nutty, slightly

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Center
Notes

New Center Publications Available

The Center produced the third title in its Research Briefs series this fall. *Alternative Food Initiatives in California: Local Efforts Address Systemic Issues* summarizes a study of a range of California organizations that address alternative food systems issues and practices. Says lead author Patricia Allen, "We undertook this study to develop a better understanding of the contribution these groups are making to the development of sustainable food systems in California." The Research Brief examines the history of alternative food initiatives (AFIs) in the state, the concerns, activities, and benefits of current AFIs , and potential ways to strengthen these efforts. Center faculty affiliate Margaret FitzSimmons and UCSC Environmental Studies graduate students Michael Goodman and Keith Warner co-authored the brief.


The CENTER for AGROECOLOGY & SUSTAINABLE FOOD SYSTEMS
UNIVERSITY OF CALIFORNIA, SANTA CRUZ | RESEARCH BRIEF #3, FALL 2003

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Research Brief #3

Alternative Food Initiatives in California: Local Efforts Address Systemic Issues

This research project would not have been possible without the interest, support, and enthusiasm of the leaders and participants in California's alternative food initiatives. We thank the representatives of the organizations we interviewed for their generous contributions of time and thought, and for their commitment to improving the food system.

People are increasingly concerned about food. Issues range from how it is produced and distributed, the health effects of industrially produced food, and the environmental consequences of chemically-intensive farming practices, to the political and economic implications of a concentrated and globalized food system. Consumers, activists, and farmers are challenging the existing food system and seeking to build alternatives through new initiatives and civic organizations, referred to here as alternative food initiatives (AFIs).

Some AFI groups act to reconnect farmers and consumers through farmers' markets, community-supported agriculture, and the reinvigoration of small family farms; their goals are to develop community-based food systems grounded in regional agriculture and local decision-making. Others focus on organizing and empowering marginalized communities through projects such as urban gardens and food-based micro-enterprise or job training programs. And some engage in education about the food system and ecological agriculture for school children, growers, or the general public.

This research brief reports on a study of the remarkable range of California organizations that address alternative food systems issues and practices. We undertook this study in order to develop a better understanding of the contribution these groups are making to the development of sustainable food systems in California.

To provide the reader with a context for this study, we first briefly review the unique aspects of California's agricultural system that gave rise to the AFIs examined here. We discuss the way that the AFI movement has evolved over the last three decades as its focus changed from primarily farm-labor issues to an emphasis on urban, consumer, and small farmer/family

Summary of Findings

- Large numbers of well-informed Californians are concerned about the state of the current food system in its environmental, economic, and social dimensions. Major concerns include—
  - the extent to which food production and consumption have become disconnected, e.g., the separation between farmers and consumers, and a lack of knowledge about cooking and nutrition;
  - the disempowering of producers and consumers in an increasingly globalized and standardized food system;
  - the limited availability of affordable fresh, nutritious food for low-income people.
- Interviewees tended to share a perception that these kinds of food-system problems have systemic rather than local or individual causes.
- Despite this analysis, California AFIs are much more focused on local issues and activities in which participants feel they can make a near-term difference, rather than on broad issues and large-scale actions.
- California AFIs are positioned to move the agrifood system in the direction of greater ecological soundness and social justice, thanks to the extremely high levels of commitment of those working on AFIs.
- California AFIs' efforts would be enhanced if they were able to work more closely, with a common purpose, while maintaining their particular and local activities.
- Developing a shared vision of a sustainable food system and the articulation of a menu of action items would greatly increase the collective effectiveness of California AFIs.
- The ability of AFIs to develop a shared vision is limited by the scarcity of funding available to support broad-based, collaborative efforts.

This fall the Center also produced its *2001–2003 Activity Report and Research Summary*, highlighting activities from the past two years of research, education, and outreach. Included are summaries of recently completed and ongoing research projects, highlights of undergraduate, graduate, and apprentice education programs, and a review of community education efforts, publications, and other outreach projects.

Copies of the Center's *2001–2003 Activity Report and Research Summary* and *Alternative Food Initiatives in California: Local Efforts Address Systemic Issues* (Center Research Brief #3) are available free by contacting jonitann@ucsc.edu or calling 831.459-3240. Both publications are also available in PDF format at www.ucsc.edu/casfs.

New Field Trip Program Addresses Kids and Nutrition

Concern over the alarming levels of preventable childhood disease and obesity is not just in the headlines, it's moving into our classrooms. Teachers who want to help their students become more educated food consumers can now

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access an innovative educational resource—a field trip program being offered by the Life Lab Science Program called "Field-to-Market-to-You." Life Lab is a Center affiliate, with its headquarters and Garden Classroom educational garden located at the Center's UCSC Farm facility.

The new Field-to-Market-to-You project is a free program offering two different age-appropriate curricula, one for students in the fourth through sixth grades, and a new program for second and third grade students that meets many state education standards for the social sciences.

Field-to-Market-to-You is a collaboration between Life Lab Science Program and underwriter New Leaf Community Markets. Each program includes a two-hour in-class session, and a two-hour grocery store exploration at New Leaf Community Markets that brings the concepts learned in the classroom to life with hands-on learning activities. Sessions include—

· Brainstorming the life-cycle of food production, including farming, processing, distribution, and transportation.
· Identifying the benefits of local and non-local foods.
· Deciphering food and nutrition labels and identifying elements such as total fats, saturated fats, sugar, carbohydrates, and protein.
· Discussing the impact of waste and identifying options such as recycling, re-using and composting.
· Investigating the source of produce and other foods.
· Comparing bulk versus packaged foods.

"New Leaf is dedicated to educating our community about the implications of their consumer choices and to supporting the valuable work of organizations like Life Lab. We are also committed to supporting area schools. The creation of Field-to-Market-to-You is a good example of how businesses and non-profits can work together to enrich our community," said Sarah Miles, Marketing Director, New Leaf Community Markets.

Field-to-Market-to-You is offered throughout the school year. Teachers, students and parents who would like to register or would like more information about this and other programs offered by the Life Lab Science Program can visit www.lifelab.org or call 831.459-2001.

Grants and Gifts Support Training, Demonstration, and Outreach

This fall eleven different funders gave grants and gifts for training, outreach, and demonstration projects that will happen through the Center's Apprenticeship Program in 2004.

In addition to bolstering the Apprenticeship's 2004 training course for 36 organic farmers and gardeners, this funding will allow for the publication of a direct-marketing training manual, stipends and scholarship support for Apprenticeship trainees, the development of an organic rose demonstration area and educational booklet, a new organic orchard demonstration area, books for the Apprenticeship library, and a publication profiling the work of Apprenticeship alumni.

Grant and gift funding have strengthened the Apprenticeship and greatly increased its outreach and demonstration projects that reach an ever-broadening audience. The Apprenticeship raises much of its own operating budget through produce and plant sales (approximately $120,000/year) and through the fees that trainees pay to the program (approximately $117,000/year). The University of California provides over 10% of the training program's operating budget, along with the Farm & Garden's water, land, utilities, and some services and salary support.

Without support from foundations and individuals, however—which now provide approximately 20% of the operating and project funds—the Apprenticeship would not be able to continue its important work. Funders like Newman's Own Organics have provided support for the program for six years, and many listed below have supported the program for more than one year.

We wish to express our gratitude to the funders who gave this fall for the purposes listed below –

▸ Support for Apprenticeship education and training from these foundations will pay for farm and garden manager and instructor salaries, second-year apprentice stipends, and scholarships –

- The David B. Gold Foundation – $25,000
- The Wallace Genetic Foundation – $40,000
- An anonymous foundation – $25,000
- Gaia Fund – $5,000
- Jan and Lyn Dash for the Honore Dash Memorial Fund – $3,000

▸ Outreach and education about Community Supported Agriculture (CSA) and the creation of a CSA Training Manual for teaching about direct marketing will be supported by –

- True North Foundation – $25,000
- Foundation for Sustainability and Innovation – $7,500
- Organic Farming Research Foundation – $5,000

▸ A new organic rose demonstration area at the Alan Chadwick Garden, classes, and an educational booklet will be created with a $15,000 grant from the Stanley Smith Horticultural Trust.

▸ A booklet and web page profiling the work of some of the over one thousand Apprenticeship alumni will be created with a $5,000 gift from Meg Cadoux Hirshberg and Gary Hirshberg of Stonyfield Farm, Inc.

▸ New trees for the organic demonstration orchard and new books for the Apprenticeship library will be purchased through a $3,000 grant from the Monterey Bay Chapter of the California Association of Nurseries and Garden Centers.

New Publication Examines Benefits of Localized Food Systems

More and more, activists and organizations that want to increase food security, support sustainable agriculture and help family farmers are working to create more localized food systems. Farmers' markets, community supported agriculture (CSA), "buy local" campaigns, direct sales of food from farmers to schools, and urban gardens are all examples of ventures aimed at localizing the food system—getting our food from sources as close to home as possible.

If you want to know more about why so many efforts are focusing on "local," *Bringing the Food Economy Home* explains the rationale for this movement in thorough detail. The majority of the book focuses on the problems associated with the globalized and industrialized food system, and the benefits of a more localized one.

The authors, Helena Norberg-Hodge, Todd Merrifield and Steven Gorelick, start by contrasting global and local food systems. They state that the globalized food system " . . . is characterized by large-scale, highly mechanized, monocultural, and chemical-intensive methods with production oriented toward distant and increasingly global markets (p. 3)." In the authors' view, local food systems involve "small-scale" and "resource-conserving" systems that focus on " . . . local and regional consumption, with relatively short distances—or food miles—between producers and consumer (p. 4)."

Subsequent chapters describe the problems with industrialized food production, processing, transportation and ownership, as well as the perceived and potential consequences of these systems for our health, economies, communities and future food security. For example, they point out that corporate consolidation has had several negative effects. The consolidation of agribusiness has left a few large organizations in charge of almost everything that supports and is connected to farming—leaving farmers with little control over prices and thus their livelihood. Consolidation also hurts the community. Even though some large retail organizations claim to provide more jobs, " . . . it is estimated that megamarkets destroy three jobs for every two they create (p. 68)."

The authors also examine the potential human health effects of the large-scale, intensive animal production typical of industrial agriculture. Half of the antibiotics produced in the U.S. are used in these factory farms, to deal with or prevent disease outbreaks among the many tightly confined animals, or simply to promote their growth. This overuse of antibiotics is implicated in the increasing resistance of bacteria to antibiotics used to treat infections in people. These are just two of the many negative impacts of a global food system described in *Bringing the Food Economy Home*.

Conversley, the authors point out many benefits that can come from a more localized food system. One of their strongest arguments for local production is related to the distance "global food" currently travels—an average of approximately 1,500 miles from producer to consumer. In contrast, locally produced foods use " . . . far less energy, and produce less pollution and greenhouse gases, than food from the global system (p. 17)." The authors also claim that local food is probably healthier, since it is likely to have more vitamins than global foods, which are highly processed or picked prematurely to be shipped around the world. They also point out that local food systems are likely better for the community in terms of quality of life, participatory democracy, and economic equity.

To create this more localized food system, the authors are not suggesting that every small community should be self-supporting, or that all trade should stop, but that we should aim to " . . . reduce unnecessary transport while encouraging changes that strengthen and diversify economies at the community as well as national level (p. 113)."

To begin this process of localization, the authors make several important recommendations. They point out that the issue needs to be addressed at political levels ranging from the international to the local. For example, at the international level they suggest that groups should join together to challenge the rules of North American Free Trade Agreement (NAFTA) and the General Agreement on Tariffs and Trade (GATT), organizations that support and encourage the broadening of rights, and power, for global corporations. At a national level, they advocate redistributing farm subsidies to smaller and more ecological farms.

The authors emphasize the importance of people acting as citizens in a democracy. Needed policy changes can be aided by the actions of local people, such as when individuals mobilized to disallow the inclusion of genetically engineered seeds, sewage sludge and irradiated foods in the

> *continues on next page*

federal organic law. They also encourage people to not only buy locally grown food, but other locally produced items, and to support local ventures such as community banks.

While this book has much to offer, its arguments would be strengthened by additional supporting data. Unfortunately, such data are rarely available due in large part to the limited resources available for research on food systems issues. Given the current context, the authors present a well-articulated argument in favor of local food systems. If you want to learn more about this strategy for addressing problems in the food system, *Bringing the Food Economy Home* offers a persuasive, useful resource.

– Jan Perez

Authors Helena Norberg-Hodge, Todd Merrifield, and Steve Gorelick are with the International Society for Ecology and Culture.

Growing Beans in the Home Garden

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onion-like flavor and crumbly texture. Cook slowly at a simmer so as not to break up the beans.

Black Valentine – A type of turtle bean related to the kidney bean. Turns purple after cooking. Has a meaty, rich texture and a nutty flavor.

Jacob's Cattle – A bean of Mexican origin (despite the biblical-sounding name). Brown speckled white, resembling cowhide but cooking to a smooth, nutty flavor and texture. A tepary bean that likes desert conditions but, surprisingly, thrives as far north as New England.

Dried beans should be the staple winter cooking ingredient for soups and stews.

– Orin Martin

Seed Sources

W. Atlee Burpee & Co.
300 Park Ave.
Warminster, PA 18991
(800) 888-1447 www.burpee.com

The Cook's Garden
Burlington, VT
PO Box 5010
Hodges, SC 29563 (order center)
(800) 457-9703 www.cooksgarden.com

Johnny's Selected Seeds
Foss Hill Rd.
Albion, ME 04910-9731
(207) 437-4301 www.johnnyseeds.com

Seed Savers Exchange
203 Rural Ave.
Decorah, IA 52101
www.seedsavers.org

Territorial Seed Co.
P.O. Box 158
Cottage Grove, OR 97424
(541) 942-9547 www.territorial-seed.com

Community Agroecology Network

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areas that local coffee farmers identified as possible responses to the coffee price crisis: finding ways to diversify coffee plantations with marketable plant species, and expanding knowledge of and sales through alternative, more lucrative coffee networks. This includes analyzing the relation between agroecological conditions, management practices, and the resulting coffee quality—the key factor in selling to alternative markets.

Thanks in part to Méndez's efforts, Tacuba's CAN cooperatives are now ready to start direct marketing green coffee beans to small coffee roasting companies in the U.S., with the goal of generating better returns for growers than are available through conventional marketing channels.

Matagalpa

In Matagalpa, the Isabelia and Dariense mountain ranges of northern Nicaragua combine to form a diverse landscape of cloud forests, rich volcanic soils, and small mountain valleys. Growers have cultivated coffee there since the mid nineteenth century, when German farmers introduced the crop.

Despite its long agricultural history and rich resource base, the fallout from plunging coffee prices is stark in Matagalpa. According to the U.N. World Food Program, half of all the children there suffer from malnutrition. The program is delivering emergency rations to 60,000 people in the region—an area that never needed this type of aid before the coffee crisis.

To help Matagalpa's growers develop more profitable opportunities, UCSC Environmental Studies graduate student Chris Bacon works closely with the Organization of Northern Coffee Cooperatives (CECOCAFEN) and CAFENICA, a national association of small-scale coffee farming cooperatives. His research has shown that growers linked to cooperatives selling to the organic and Fair Trade coffee markets receive two to three times the return of those selling to conventional markets. However, Bacon also found that the market for Fair Trade and organically produced coffee is limited, and many growers are able to sell half or less of their crop through these channels.

Showing growers how to improve the taste of their coffee—and thus increase its chances of entering the lucrative specialty coffee market—is one goal of Bacon's work. He assists CECOCAFEN's professional coffee tasters and technical assistance teams to teach growers how to recognize the components of a high quality cup of coffee. CAN has also facilitated farmer exchanges between growers from Matagalpa and those from Tacuba.

CECOCAFEN works with CAN to develop direct marketing based on the model developed at Agua Buena in Costa Rica (see below), and hopes to soon offer coffee from Matagalpa directly to U.S. consumers.

"FINDING A GOOD MARKET FOR THE COFFEE BEING GROWN BY THESE COMMUNITIES IS THE KEY NEED RIGHT NOW"

Robbie Jaffe

Daryl Cole (left), Steve Gliessman (center), and Roberto Jimenez on Jimenez's coffee farm in Agua Buena, Costa Rica.

Agua Buena

CAN's connection to the small southern Costa Rican village of Agua Buena in the county of Coto Brus goes back 32 years, to when Steve Gliessman lived in the community and conducted agroecological research there. He also partnered with Darryl Cole to run Finca Loma Linda, a small farm where they grew coffee and diverse vegetable crops.

During Gliessman and Jaffe's sabbatical visit, Cole helped facilitate a connection with members of Coopabuena, the local coffee cooperative. Explains Jaffe, "[The cooperative] saw the coffee crisis coming and was trying to figure out how to create a niche. At that point they were exploring how to get into the Fair Trade market. They were already moving in the direction of roasting their own beans."

The CAN program has gone one step further than Fair Trade, developing a direct link between U.S. consumers and Coopabuena coffee growers who are in transition to organic production or already growing organically. By skipping the "middle man," the cooperative receives 100% of sales proceeds. This translates to $3.77 per pound of coffee—three times the minimum guaranteed by Fair Trade agreements.

Research and education in the community focus on training farmers in concepts of agroecology and sustainable farming practices. Programa Pueblos, a community outreach program created by the cooperative, develops programs and workshops for farmers.

Gliessman's involvement in Agua Buena has also generated interest from other UCSC researchers. Environmental Studies professor Karen Holl and graduate student Rebecca Cole are studying ways to restore farmland degraded by non-sustainable practices over the years. Through the "Anillo" or ring project, an outgrowth of their work, the community hopes to develop a circle of reforestation around the village.

An internship program promoted by CAN and offered through Finca Loma Linda also brings UCSC undergraduates and other students to Agua Buena to live with the villagers, conduct agroecological research, and work on community projects such as a Life Lab children's garden.

BRINGING THE MESSAGE HOME

UCSC students are actively involved with CAN on campus, where they educate their peers and others about the coffee crisis and how consumers can make a difference. In February CAN's student members will help host a national meeting at UCSC of undergraduates involved in the Fair Trade movement on university campuses.

Santa Cruz-based CAN members are also promoting coffee from the communities to outlets on the UCSC campus. "We're exploring how to work with the UCSC activist group Comercio Justo," says Jaffe. "They recently convinced the various cafeterias to carry Fair Trade coffee; now we want to encourage them to carry coffee grown by CAN producers."

"Finding a good market for the coffee being grown by these communities is the key need right now," she continues. "We need to show people how they can make a difference with their purchasing power." Despite the recent boom in the "specialty" coffee market, the supply of coffee being grown organically or under Fair Trade standards far outstrips current demand. Ultimately, it will be up to consumers to give growers the market they need to improve their coffee growing practices and provide them with a decent living.

"It's a positive feedback loop that works both ways: consumers buying coffee to support growers who use sustainable techniques, and growers creating a product that consumers want," says Gliessman. By linking growers directly with consumers, CAN gives coffee drinkers the chance to make a difference both in farmers' livelihoods and in the environmental sustainability of their communities.

– Martha Brown

For more information on the Community Agroecology Network and details on Coopabuena's coffee subscription program, see www.agroecology.org/can, send email to can@planet-save.com, or call 831.459-5818.

Santa Cruz area
events

▶ Building Solar Greenhouses, Saturday, February 21, 2004, 9 am–1 pm, Louise Cain Gatehouse, UCSC Farm. Builder and farmer Thomas Wittman will show you how to construct a greenhouse for the home garden or market garden so that you can readily start plants from seeds and cuttings, and extend your growing season. $15 for Friends' members; $25 for non-members, payable the day of the workshop (no pre-registration necessary). Call 831.459-3240 for more information.

▶ Spring Cooking Workshop, Saturday, March 20, 1 pm–4 pm, Feel Good Foods Kitchen, 306 Potrero Street, Santa Cruz. Caterers Amy Linstrom and Heidi Schlecht of Feel Good Foods will show you how to turn spring produce, artisan cheeses, and other local foods into a wonderful meal.

Learn new cookings tips and recipes from two expert chefs with a focus on fresh, local, organic ingredients. $40 for Friends' members; $45 for non-members, includes food costs and tastings. Please pre-register by Wednesday, March 17 by calling 831.459-3240.

▶ Introduction to Bee Keeping, Saturday, April 17, 2 pm–6 pm, Louise Cain Gatehouse, UCSC Farm. Join Albie Miles for a look into the life of they honeybee. This workshop is ideal for those who are thinking about getting into bee keeping or need a brief refresher course. $5–$10 (sliding scale) for Friends' members; $15 for non-members, payable the day of the workshop (no pre-registration necessary). Call 831.459-3240 for more information.

▶ Gopher Control and Exclusion, Saturday, April 24, 10 am–12 noon, Louise Cain Gatehouse, UCSC Farm. Thomas Wittman of Gophers, Ltd. and the UCSC Farm will teach you about gopher natural history and the best approaches to keeping your garden gopher free. $10 for Friends' members; $15 for non-members, payable the day of the workshop (no pre-registration necessary). Call 831.459-3240 for more information.

▶ Spring Plant Sale, Saturday, and Sunday, May 1 and 2, 10 am–2 pm, Barn Theater parking lot (corner of Bay and HIgh streets), UCSC. Organically grown flower, herb, and vegetable starts, perennials, and other landscape plants. Call 831.459-3240 for more information.

California

▶ Organic Pear Short Course, Tuesday, February 17, Rohnert Park. This UC short course will feature information on the latest research, organic regulations and certification, economics, marketing and pest management. Presenters include UC Cooperative Extension farm advisors and specialists, California Department of Food and Agriculture personnel, and industry representatives.The course will also include information on tree nutrition, vertebrate management, and postharvest and food safety.

Registration for the pear short course is $40 before Feb. 3 ($50 after), and includes materials, refreshments and lunch. For more information, contact UC Cooperative Extension, Lake County, celake@ucdavis.edu, (707) 263-6838.

Meeting brochures with registration forms for the short course can be downloaded from SAREP's web site at www.sarep.ucdavis.edu/organic/courses.htm. The short course is sponsored by UC Cooperative Extension, the UC Organic Farming Research Workgroup, and SAREP.

▶ The 22nd National Pesticide Forum, Friday through Sunday, April 2–4, Berkeley. This year,'s conference theme is "Unite for Change: New Approaches to Pesticides and Environmental Health." Sponsored by Beyond Pesticides, Californians for Pesticide Reform, and Pesticide Action Network North America. For more information visiti www.beyhondpesticides.org/forum.

International

▶ International Short Course on Agroecology, July 11–24, 2004, Huatusco, Veracruz, and Cardénas, Tabasco, Mexico. The theme of this year's short course is "Agroecology of Tropical Zones: Integrating Agroecosystems in the Regional Landscape."

The course (taught in Spanish) will focus on analyzing the social, economic and ecological dynamics surrounding the interactions between local agroecosystems and their surrounding landscapes. Organizers include Steve Gliessman, Carlos Guadarrama, Armando Mejía, and Moisés Amador.

For more information see www.agroecology.org/shortcourse.

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