



The CENTER for
AGROECOLOGY
& SUSTAINABLE
FOOD SYSTEMS

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the Cultivar

The CENTER for AGROECOLOGY & SUSTAINABLE FOOD SYSTEMS

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New Tracking Method Helps Researchers Design Pest Control Strategies

On a clear spring morning a light breeze ruffles the rows of organic strawberry plants that march across acres of rolling hills near Prunedale, California. Nicknamed “Eagle Tree” for the huge live oak that occasionally hosts a golden eagle, this Central Coast ranch is the site of groundbreaking work by researchers from the Center for Agroecology and Sustainable Food Systems on controlling lygus bugs (*Lygus hesperus*), one of the strawberry industry’s most tenacious pests.

It only takes one or two lygus bugs in a 20-plant sample to exceed the “economic threshold,” where lygus damage to developing berries may cause economic loss to a grower. Limiting lygus populations with conventional tools can mean 8–10 insecticide applications per year at a cost of more than \$500 an acre. Without these chemical options, organic growers must find alternative ways to keep lygus bug populations below these thresholds.

Here at Eagle Tree, that alternative comes in the form of bright green stands of alfalfa plants that punctuate the rows of strawberries. Center researchers Sean Swezey, Janet Bryer, and Diego Nieto have spent the past ten years developing and refining an alfalfa-based “trap crop” system for dealing with lygus. Drawn to the alfalfa, the lygus can be controlled with a tractor-mounted vacuum, or “bug vac,” that runs across the top of the alfalfa plantings, sucking up the pest.

Trap crops have eliminated the need for the Eagle Tree growers to run bug vacs across the strawberry crop itself, saving \$743 per acre annually in fuel costs, labor, and lygus damage (Swezey et al. 2007). By eliminating “full field” vacuuming, the trap crop system also preserves the natural enemies in the strawberries that help control lygus populations. In their work with conventional growers, the Center’s research team has found that growers can reduce their pesticide use significantly by focusing lygus control sprays on the alfalfa trap crop rather than the strawberries.

Thanks to the trap crops and to a lygus parasite, *Peristenus relictus*, that was introduced by the researchers several years ago, lygus populations at Eagle Tree—where all the berries are

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Researcher Scott Machtley applies a marking spray as part of a study of springtime lygus bug movement.

organically grown—have been maintained below economic thresholds for several consecutive years. “Larry’s confidence has increased greatly in terms of effective lygus bug management on his organic strawberry farm, and numbers and damage from lygus bug at Eagle Tree have decreased over the past several years,” says Swezey, referring to ranch owner Larry Eddings.

OPTIMIZING TRAP CROPS FOR LYGUS CONTROL

Although successful both in reducing lygus numbers and limiting lygus damage, the trap crop system still has plenty of room for fine-tuning. There’s some guesswork involved in deciding how far apart the trap crops should be planted to be effective—and thus how much land a grower needs to take out of production and maintain separately from the strawberry crops in order to use the system.

“Up to now we’ve been arranging the trap crops based on a reasonable economic approach for the grower,” says Swezey. “What we want to know is the optimal distance between trap crops we need to have in order to most effectively control lygus, and to find that out we need to know how far lygus move from the trap crops into the strawberry rows.”

In 2008, Center researchers teamed up with James Hagler and Scott Machtley of the USDA Arid-Land Agricultural Research Center in Maricopa, Arizona to address that question. A pioneer in studies of insect predator and prey movement, Hagler taught the research team a simple, effective way to measure how far lygus move from the trap crop into the surrounding berries.

First, Hagler and Machtley sprayed a fine mist of diluted skim milk and/or egg whites over the trap crop. Like a little

kid walking through wet paint, the lygus are “marked” by the milk or egg proteins when they move through the sprayed alfalfa.

Twenty-four and 48 hours after the alfalfa was marked, and again after 10 days, the research team collected insects at various distances from the trap crop using a small vacuum sampler (a leafblower run in reverse). The samples and collection details were sent to Hagler’s Arizona lab, where an antibody test revealed whether or not the lygus or any other insect the researchers collected carried the egg or milk marking. “We can process up to a thousand samples a day,” says Hagler. “It’s a quick, easy and cheap way to determine insect movement patterns.”

Preliminary results from the 2008 study show that most lygus make very short flights and don’t stray far from the trap crop. In what Swezey describes as a “push-pull” phenomenon, the trap crop acts to “pull” lygus into a zone around the alfalfa that may extend only a row or two into the adjacent strawberries. At the same time, the alfalfa provides a sanctuary for beneficial insects to rest and feed, acting as a source site that “pushes” predatory insects such as minute pirate bugs and parasitoids into the surrounding strawberries, where they help control populations of lygus and other insect pests.

Center researchers will use this information to help refine the spacing of trap crops, and plan future studies of lygus natural enemies’ movements from the trap crops into strawberries.

RESEARCHERS TRACK SPRINGTIME LYGUS MOVEMENTS

In the spring of 2009, the research group once again convened at Eagle Tree to address other longstanding questions: as lygus disperse into strawberry fields from surrounding vegetation, do they prefer to immigrate to the berries or to the trap crops? And how far into the fields do they move during this initial immigration?

“Our theory is that as non-crop vegetation dries out in the spring, the lygus move into the strawberry fields to feed and reproduce. What we want to find out is, where do they concentrate during that initial movement? We’ve been assuming that they prefer to move to the trap crops located nearest to the wild vegetation, but we want to confirm that that’s really the case,” says Nieto.

To find out how far they move and what type of vegetation the lygus prefer in the spring, the group sprayed stands of blooming wild radish (*Raphanus raphanistrum*) that border the fields with a fine mist of diluted milk, then collected samples of insects at different locations within the fields at 24- and 48-hour intervals, and again after 10 days, sampling from both strawberry plants and the alfalfa trap crops. The test was repeated two weeks later.

Finding out where the lygus go in the spring could help growers refine their pest control efforts. “If the grower could focus their vacuuming or spraying efforts on those sites at a particular time, that would pay dividends later in the summer in terms of limiting future lygus populations,” says Nieto.

> continues on page 22

Diego Nieto



With direction from Janet Bryer and James Hagler, Scott Machtley marks an alfalfa trap crop at Eagle Tree Ranch.

Center Helps Lay the Groundwork for a Domestic Fair Trade Label on the West Coast

As the efforts of students, activists, growers, and consumers in California continue to advance the sustainable agriculture movement, there remains a critical issue that has proven difficult to address: social justice for those who grow and process our food.

Environmental and economic issues have been prioritized over social justice issues (such as labor concerns) in American marketing campaigns and labels. Both the USDA's certified "Organic" label and regional "Buy Fresh, Buy Local" initiatives have made it possible for people to support the environment and local economies through their food purchases. As demand has shifted towards these organic and local preferences, so too has supply. Driven by burgeoning consumer interest and financial support, there are now over 13,000 organic¹ producers and roughly 60 Buy Fresh, Buy Local chapters in the US.²

However, these eco-labels, as well as union labels, do not yet contain clear and measured standards for social justice. While Fair Trade-certified products *have* accounted for social justice components, they are internationally based and mainly involve niche items such as chocolate, coffee, and tea, and thus have a limited applicability to a wider range of products. "Local" products are often founded on first-party claims (usually a statement made by a producer), a marketing phrase that lacks the credibility of an unbiased third-party certification, which involves an independent inspection to verify product claims.

Products that are subject to first-party and second-party claims can offer meaningful and measurable social and en-

What Do We Mean by Social Justice?

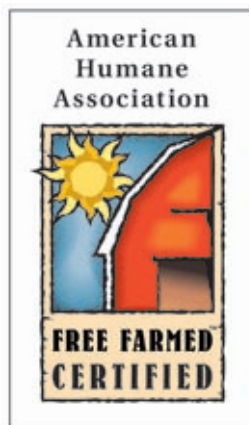
Social justice in this context means that the people involved in food production are treated with respect, dignity, and fairness. Farm workers are paid fair wages and treated humanely. Farmers receive fair pricing contracts for their produce.

There are a number of social justice issues that particularly affect farm labor; for example –

At present, the U.S. death rate for agricultural workers is five times greater than the average of all other industries.

More than three-fifths of farmworkers are poor, with seventy-five percent of them earning less than \$10,000 per year.³ This predominantly foreign-born workforce continues to be exposed to pesticides and suffer from limited access to proper healthcare.

The large-scale farming and agri-business industry place a high priority on minimizing labor costs and bringing the cheapest product possible to the consumer in order to maximize profits. The use of farm labor contractors (FLCs) by both conventional and organic farms has further disempowered workers by introducing a third party or middleman—whose own capital interests are of utmost priority—to make decisions for workers on behalf of grower requests. FLCs have inadequately replaced labor unions in the role of mediator between workers and employers in the agricultural industry. FLCs are now largely responsible for hiring, supervising, and paying the workers, but have no involvement in social justice and worker rights issues.



Eco-labels include those that encourage local buying, address social and ecological issues for international producers, and ensure humane livestock conditions.

vironmental benefits. However, third-party certification provides the highest degree of confidence that standards have been met.⁴ In regards to domestic social justice criteria there remains a need for programs through which consumers can easily acknowledge and support food produced with socially just practices.

As studies in the Central Coast region have shown, consumers want to know more about their food *and* are explicitly interested in purchasing food items that support social justice as a component of sustainability.^{5, 5a} Despite this expressed interest from consumers, specific opportunities for consumers to support domestic fair trade products are virtually non-existent.

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from the Director

Welcome to this special issue of *The Cultivar*. We took time away from newsletter production this past fall to evaluate our communications efforts, and so are bringing you a double issue highlighting some of the past year's activities at the Center for Agroecology & Sustainable Food Systems.

As you'll see from this issue, we've been busy. From our Grow a Farmer campaign (*page 7*) to a new Community Supported Agriculture crop-planning system (*page 9*) to groundbreaking work in social justice efforts (*page 3*) to ongoing efforts to improve organic farming systems (*pages 1 and 10*), Center members have been working hard to advance our mission of creating a more just and sustainable food system through research, education and public service.

This year has been marked by many expanded research activities and education efforts. For example, we are working with more undergraduates through new educational opportunities (*page 19*), and have several new research initiatives underway. In our social issues research program we are conducting new research on gender inequalities in the food and farming system (*page 13*), funded by the National Science Foundation and the Appleton Foundation, as well as a study on the role that businesses can play in promoting food system changes (*page 13*). In our agroecological research program we are continuing our efforts to understand how to manage one of the strawberry industry's most destructive pests (*see cover story*), work that garnered a recent grant from the US Department of Agriculture.

At the same time that we are expanding activities we are looking for ways to be more effective in the work we do. For example, we are studying ways to improve our experiential education efforts and ways to increase our relevance to meeting the needs of underserved people.

Another way we are looking to increase our effectiveness is to improve the way we communicate with our many different audiences. You can help us by filling out the mailing list update and readership survey (*pages 23–24*). Like many University of California programs, the Center is facing budget cuts and must find the most efficient and effective ways to bring news of our efforts to as broad an audience as possible in light of a shrinking resource base. Your input will help us continue to bring you information on our many activities and our ambitious research agenda. Your response will be crucial in helping us shape our future programs.

There has never been a more important time to focus on the sustainability of our food and farming system, and we are grateful to you for your work and for joining us on this quest!

– PATRICIA ALLEN, DIRECTOR

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The Center for Agroecology & Sustainable Food Systems is located at the University of California, Santa Cruz. Our mission is to increase environmental and social justice in the food and agricultural system. On the UCSC campus, CASFS manages the 3-acre Alan Chadwick Garden and 25-acre UCSC Farm. Both sites are open to the public daily from 8 am – 6 pm year round.

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Study Examines Food System Priorities, Perspectives of College Students

College students can be powerful “change agents” when it comes to the food system—often living away from home and buying their own meals, they can choose to support food with certain values, such as locally grown, organic or sustainably produced. Students have emerged as one of the driving forces behind recent efforts to make campus food systems more sustainable by working to increase the percent of local, organic and humanely raised food served in dining halls and other campus eateries. According to CASFS social issues researcher Jan Perez, “College students play an important role in farm-to-institution efforts—30% of the documented initiatives have been started by students, and they also play a role by supporting efforts that others start.”¹

In 2007 and 2008, Perez surveyed college students nationwide to find out what types of food qualities students want to support, whether they’re willing to pay more for certain food qualities, and how they define terms such as “sustainable” and “local.” By understanding more about college students’ perspectives, researchers studying farm-to-institution projects can better advise those interested in promoting these efforts.

Perez’s work was part of a two-year study funded by the National Research Initiative of the USDA Cooperative State Research, Education and Extension Service (grant # 2006-55618-17015). The project, headed by CASFS director Patricia Allen and Shermain Hardesty of UC Davis, director of the UC Small Farm Program, examined the potential for

small- and medium-sized farms to benefit from institutional markets. Also collaborating in the study were members of the Community Alliance with Family Farmers.

Some of the highlights of Perez’s study include the following findings –

When asked to rate food qualities students wanted their colleges to provide, factors such as “safety,” “freshness,” “taste,” “nutrition,” and “affordability” topped the list (see figure 1, below). Of the values related to sustainability, “humanely produced” and “living wage” were ranked highest, while “certified organic” and “produced on a small farm” ranked lower.

“One interesting finding from this part of the survey was that students consistently ranked ‘sustainably produced’ as more important than ‘organic,’ indicating that they don’t necessarily equate the two terms,” says Perez.

Also interesting was the way that college students defined qualities most associated with the term “sustainably produced food.” Ranking highest was “does not harm the consumer,” which is not a quality used in all definitions of sustainability, but reflects students’ concerns with food safety.

Several social and environmental criteria were rated roughly equally as being part of defining “sustainably produced foods,” including safe and fair working conditions, humane care for livestock, least toxic pest control methods used, fair wages, supports community, and preserves the environment. Ranking lower were locally grown, certified

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¹<http://www.farmtocollege.org/Xgraphs/Initiators.gif>

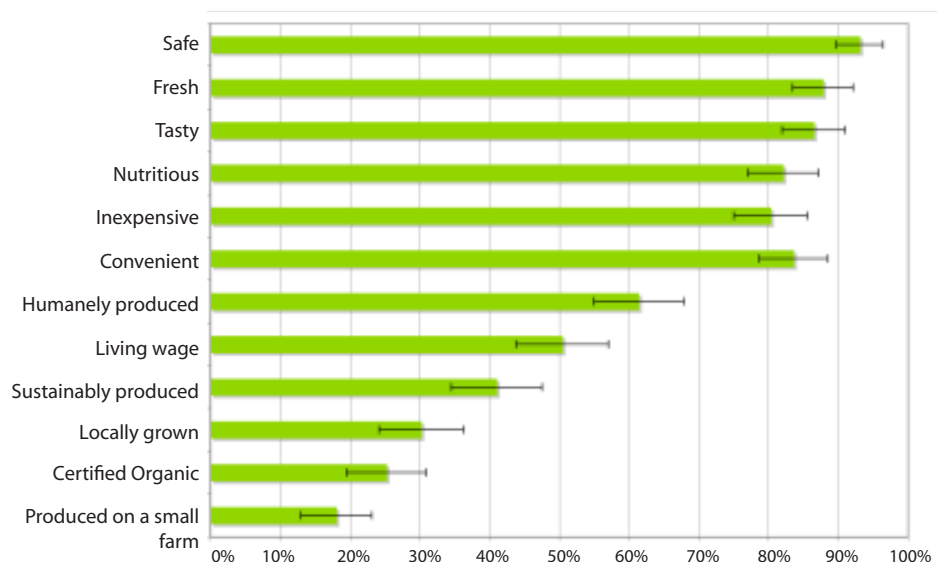


Figure 1: Percent very interested (chose 1 of top 2 levels of interest on 7 point scale) in having their college or dining service provide food with the qualities listed at left.

organic, and small scale—implying that students don’t necessarily recognize these values as factors in “sustainably produced” food (see figure 2, below).

Students were also asked how often they purchased local, organic, and fair trade items. A very small percentage of students claim to purchase these items on a weekly basis (11% for organic, 12% for local, and 8% for fair trade). However, a much higher percent said they buy organic (43%) and local (46%) at least monthly.

On the important question of whether they’d be willing to pay more for food with certain qualities, more than half of the respondents said that they’d pay somewhat more for products with organic, humane, and sustainably produced qualities, while fewer were interested in paying more for products from small farms.

Students were also asked how they define the term “local.” Interestingly, freshness was more frequently considered part of the definition of “local” than where the food was produced (choices included within the state, 0–50 mile radius, or 0–200 mile radius; see figure 3). These distance criteria came in second and were equally rated, while “I know the producer/ producer or growing conditions” ranked third. And although it was endorsed by almost 50% of respondents as being part of the definition of “local,” farm size (small or medium-sized) was the least important quality of the definition. Perez says, “This is important to note since ‘local’ is often used by advocates as being synonymous with small- and medium-sized farms.”

When asked how they would like to get more information about their food, students chose product labels, along with brochures or displays in places where they purchase or eat food, as their preferred information sources. This implies that education efforts in dining halls and cafeterias are an excellent option. Written materials, in print or on the web, are also a good place to do education, according to the survey.



Universities such as UC Santa Cruz are supporting small- and medium-size growers by purchasing locally grown organic produce to serve in campus dining halls and at special events.

Perez concludes that one communication strategy for building student support for farm-to-institution efforts could be to more clearly spell out the qualities of organic, local and small farms—instead of relying on the terms themselves to provide meaning. For example, spelling out that food is raised without toxic pesticides, or that it is providing a reasonable wage to farmers, may be more appealing to students. The other strategy is to provide education—to make clear the qualities associated with organic, local and small farms.

In educating students, Perez says that it’s also important to connect issues the movement sees as important to what students see as important. This means addressing how the bigger issues affect their health and well-being, as well as addressing both social and environmental issues.

A Center Research Brief summarizing the farm-to-institution study’s results is now being developed and will be posted to the CASFS website, casfs.ucsc.edu.

– MARTHA BROWN

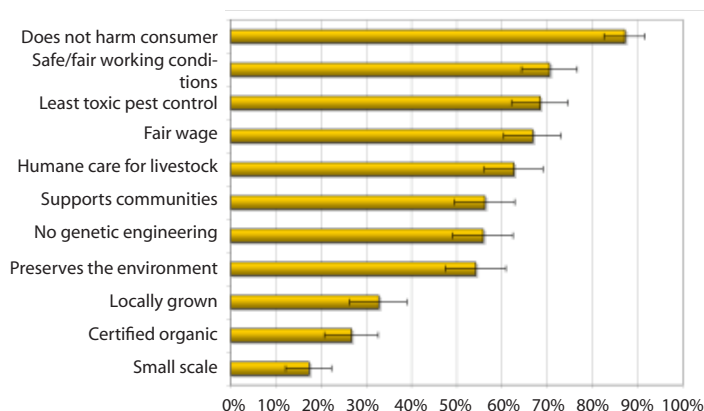


Figure 2: Percent of respondents with strong agreement (chose top 2 options out of 7 possible responses) about which qualities they would include in a definition of sustainability.

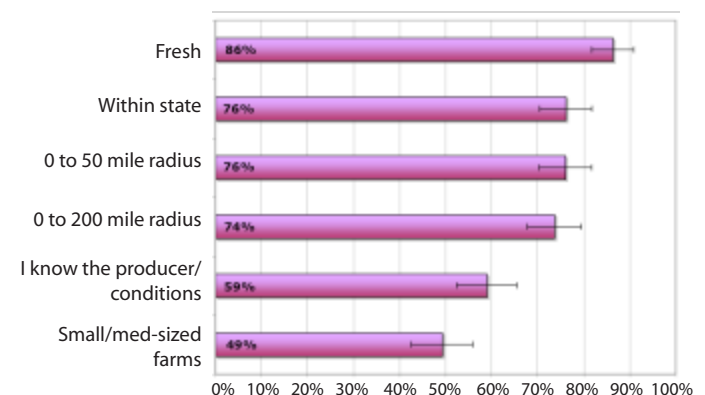


Figure 3: People who agree (chose top 3 amongst 7 responses) that the above qualities are part of a definition of local.

Grow a Farmer Campaign Reaches Goal – Apprenticeship Housing Funded

Apprentice housing will be built at the CASFS Farm this fall thanks to an outpouring of support from around the country inspired by the Grow a Farmer campaign. Permanent on-farm housing had long been planned for the participants in the Apprenticeship's six-month, full-time organic training program. The university administration approved the construction plans, but the timing for the needed fundraising did not look good last winter as we entered the worst economic period in decades. At the Ecological Farming Conference in January 2009, the Grow a Farmer Campaign was launched to broaden the fundraising effort and enlist the help of former apprentices, Friends of the UCSC Farm & Garden, and restaurants and businesses that care about sustainable food systems.

Soon a website was up and a calendar of fundraising events filled in through the work of many volunteers, staff, and business supporters. The calendar's 27 events included 10% benefit nights at restaurants like Chez Panisse and Jardiniere, house parties and garden pizza parties organized by Apprenticeship graduates, a five-course dinner at Pie Ranch organized by a UCSC student, and a grand finale fundraiser at the top of the One Market Building in San Francisco with chef Mark Dommen. Business sponsors gave donations and did percent-benefit days. Organic farms and wineries—many of them started and staffed by Apprenticeship alumni—donated products for events. Countless volunteers chipped in to make the events not just successful fundraisers but excellent showcases for organic, sustainable local food. In all over 60 businesses contributed with the top business donation a \$10,000 gift from Frontier Natural Products Co-op. Please see the next page for a list of all the business, restaurant, and foundation contributors.

Organizations and writers put the Grow a Farmer campaign information in their newsletters, websites, and blogs. Former apprentices and supporters not only responded to fundraising letters and emails, but forwarded them on to friends and family. Checks and online donations came in at a steady clip. In all over 400 individuals contributed, with donations ranging from \$25 to \$25,000. The top donors to the campaign were 1979 apprentice and staff member Olivia Boyce Abel, Friends of the Farm & Garden members Alec and Claudia Webster, 1978 apprentice Meg Hirshberg and her husband Gary Hirshberg, founders of Stonyfield Yogurt, and Susan and Franklin Orr, who were inspired to give by a former apprentice.

Five foundations also came through with grants and gifts, the top ones being a \$50,000 grant from Newman's Own

and a \$25,000 grant from Wallace Genetic Foundation, with additional support from the Arkay Foundation, Dreamcatcher Foundation, and McCrea Foundation.

With an earlier contribution of \$16,000 from the Friends of the UCSC Farm & Garden, over \$440,000 was raised from all of the combined sources for the housing project.

CAMPAIGN RAISES AWARENESS OF APPRENTICES' WORK

Much more than funding came from this campaign. June 2009 was declared Grow an Organic Farmer Month by the Santa Cruz County Board of Supervisors. In his proclamation, Supervisor Mark Stone expressed appreciation for "the UC Santa Cruz-trained apprentices who have planted roots all over the United States and in the world as they practice their innovative groundbreaking work in sustainable agriculture and food systems."

The Grow a Farmer campaign not only succeeded in raising funds, but also demonstrated how many people care deeply that we continue the work of training new organic farmers and gardeners—and that the training effort remain a residential program. The on-farm housing will keep the program more affordable for trainees while allowing for an immersion learning environment to enhance the training.

In reflecting on his own experience as a 1997 Apprenticeship class member, Don Burgett recalled the value of residential training: "Living where you're learning provides invaluable experience in farming and land stewardship," he said. "Observation of the fields and ecology is key to farming success, and it doesn't start at 8:00 a.m. and stop at 6:00 p.m. weekdays. The type of deep connections that apprentices make with each other and the land wouldn't happen in a commuter program."

With the construction of the permanent housing, we will be laying the foundation for another 40 years of organic training at the UCSC Farm & Garden. Nine 4-unit cabins



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will house 36 participants in the six-month organic training program held annually at CASFS. The construction project, including the redwood and canvas cabins, solar showers, accessible parking and paths, and other infrastructure, will start this September and be finished in time for the start of the 2010 Apprenticeship program in April. The groundbreaking celebration will be held September 13th.

We are incredibly grateful to everyone who has contributed to this campaign and helped to keep the Apprenticeship a residential program. A full roster of donors, including all

individual contributors, will be listed on the Grow a Farmer website and in our next issue of the *News & Notes of the UCSC Farm & Garden* newsletter. For more information on the Grow a Farmer campaign, see www.growafarmer.org. For more on the Apprenticeship, including information on applying, please see page 17 of this issue.

We extend our gratitude to everyone who has helped provide housing for hundreds of beginning farmers to come and a solid base of support for our growing work.

— ANN LINDSEY

Businesses and Foundations Supporting the Grow a Farmer Campaign

Abounding Harvest Farm
Acre Gourmet
Albert's Organics
AnEFX
Arkay Foundation
Bella Faccia Pizzeria
Blue House Farm
Bon Appétit Management Company
Bragg Health Foundation
Bread and Roses
The Bread Workshop
The Buttery
Café Gratitude
Café Zazzle
California Organic Fertilizers
Camp Joy Garden
Charlie Hong Kong
Chaya & Associates, Inc.
Chez Panisse
Christiansen Associates Gardens and Design
Chromagraphics
Companion Bakers
Costanoa
Darren Huckle, L.A.C (herbalist)
Dennis Schirmer, Inc.
Dirty Girl Farms
Dreamcatcher Foundation
Driscoll's Strawberry Associates
Earl's Organic Produce
Earthscapes
Engfer Pizza Works
Ethnographics Insight, Inc.
Everett Family Farm
FarmHouse Culture
Fifth Crow Farm
Flea Street Café
Ford's Filling Station
Free Wheelin' Farm
Frey Vineyards
Frontier Foundation/Frontier Natural Foods Co-op
Gabriella Café
Garden for the Environment, San Francisco
Gayle's Bakery and Rosticceria
Growing for Market (Fairplain Publications)
Hair by Design
Harb, Levy and Weiland LLP
Heath and Lejeune
Jacobs Farm—Del Cabo Inc

Jardiniere
Johnny's Selected Seeds
Kensington Marmalade Company
Key Events, Inc.
Lakeside Organics
Live Earth Farm
Love Apple Farm
Manresa, Chef David Kinch
Mark Stephens Yoga
Mary Offerman Pastels
Matthew Sutton Yoga
McCrea Foundation
McEvoy Ranch
Meder Street Farm
Mission Pie
Monterey Bay Certified Farmers' Market
New Leaf Community Markets
New Natives
Newman's Own Foundation
Nordic Naturals
obaboa Foundation
One Market Restaurant
Original Sin Desserts Bakery
Osmosis Day Spa
Outstanding in the Field
Passion Purveyors
Phil Foster Ranches/Pinnacle Brand
Pie Ranch Benefit Dinner with Gabriella Café
Pizza Fino
Redwood Pizzeria
Renee's Garden
Ristorante Avanti
River Café and Cheese Shop
Roots of Wellness
Seeds of Change
Shields Greenhouse
SMP/SHG, Inc.
Soif Wine Bar and Merchants, and La Posta
Sonoma Brewing/Dempsey's Restaurant
Stonyfield Farm: Profit for the Planet
Swanton Berry Farm
Telepan Restaurant
TLC Ranch
Troja Dairy Distributors
Veritable Vegetable
Wallace Genetic Foundation
Woodland Gardens



Gary Crandall

Center Farmers Design, Teach a Block Planting System for CSA Production

As members of the Center's Apprenticeship program weed and thin rows of young beets, carrots and broccoli on a cool late-spring morning, farm manager Jim Leap explains how the orderly "block" system used to produce many of the crops for the UCSC Farm's 130-member Community Supported Agriculture (CSA) project has evolved over the past 12 years.

"Prior to starting the CSA in 1996, we used to grow everything—corn, potatoes, broccoli, squash, etc.—in half-acre blocks. It was an easy system to plan and manage," says Leap. But the new CSA project meant having to produce multiple successions of many crops over the course of a 7- or 8-month season.

"For the first couple of years, we reacted to that demand by just making it up as we went along—wherever there was an open bed, that's where we'd plant the next succession, so we ended up with carrots over here and beets over there, all these crops with different needs side by side," says Leap. He admits that it was a "nightmare" to cultivate, irrigate, and harvest this patchwork quilt of crops. "The harvest crew would spend half their time hunting down which little row or partial row of crops was ready that day," recalls Leap.

NEW BLOCK SYSTEM SIMPLIFIES MANAGEMENT

Today, it's easy to see how things have changed. At the far left-hand side of the two-and-a-half acre field there's a 14-row block of greens and root crops ready for tomorrow's harvest; next to that a bed of bright red and ripening strawberries; and then another block of crops that will mature in a couple of weeks, next to the newly emerged crops where the apprentices are working, which will be harvested in 4–5 weeks. Unplanted beds stretch off to the right, ready for the successions of plantings that will take place over the course of the season.

"The trick to developing this system was selecting crops that could all be planted on the same day, creating a mixed block of crops that mature within several weeks of each other, and which all have a 'short harvest window' [i.e., mature quickly and lose quality after a couple of weeks in the field]," says Liz Milazzo, the Center's field production manager.

These include crops such as lettuce, broccoli, turnips, dill, cilantro, and basil, which can be planted in successive blocks every 2–3 weeks. Longer-season crops that mature

more slowly, such as potatoes, tomatoes, and winter squash, are planted separately.

"We also had to choose crops for the successional blocks that could be managed with overhead irrigation their first 10–14 days," says Milazzo. Each roughly 1/3-acre block has its own dedicated irrigation riser, valve, and drip line header. The blocks share drip system pressure regulators and 2-inch aluminum "latch pipe" for overhead irrigation.

As Leap explains, those initial overhead irrigations are key to the system. After shaping the beds, he pre-irrigates with the sprinklers to bring up a flush of weeds, then cultivates prior to seeding or transplanting crops into the beds. "Once the crop is established with the sprinklers we go through with hula hoes to do an initial weeding in the rows, then I follow up with the tractor and cultivator to catch weeds on the sides of the beds and break up the furrow compaction," says Leap.

Overhead irrigation also saturates the whole bed, which Milazzo sees as critical to getting plants well established. As she explains, "When you wet the whole root zone you're activating mineralization of nitrogen throughout the zone, giving the plants a good place to get started. Then you pull the sprinklers and switch over to t-tape, which has the advantage of minimizing weed pressure." The system uses a single line of irrigation t-tape down the middle of each bed, which Leap has found will apply enough water for both rows of crops per bed while minimizing labor, materials and water use.

Successive blocks of crops are planted several weeks apart throughout the growing season. By rotating crops within each block from year to year, Milazzo has been able to control pests such as carrot rust fly and leaf miners. She's also incorporated summer cover crops into the system; blocks that won't be planted for a couple of months produce organic matter that will be spaded in or undercut and left on the surface as a mulch when it comes time to plant.

Both Milazzo and Leap agree that the blocking system's biggest advantage is that it focuses the growers' attention on the tasks that need to be done in a timely way.

"By grouping crops with similar needs this way, you can see what you need to do, whether it's weed control, irrigation, thinning or harvesting," says Milazzo. "It's an amazing visual aid and way to comprehend and manage something that's really complex."

— MARTHA BROWN

Organic Research Network Members Present Findings at Central Coast Workshops

Culminating five years of study on organic strawberry and vegetable systems, members of the Organic Research Network presented a summary of their findings to Central Coast growers, cooperative extension agents, and UC Santa Cruz students at a two-day series of workshops in Watsonville this summer.

The workshops offered attendees a crash course in the latest research on how to manage nutrients, control pests, weeds and diseases, and evaluate the economics of crop rotations in organically grown strawberries and other vegetables.

The Organic Research Network was established in 2004 with funding from a US Department of Agriculture grant to a group of Center for Agroecology and Sustainable Food Systems researchers and faculty affiliates. With this support, researchers Carol Shennan, Steve Gliessman, Joji Muramoto, and Sean Swezey teamed with scientists from UC Cooperative Extension (UCCE), the USDA's Agricultural Research Station, and UC Davis to develop studies on some of the most challenging aspects of organic strawberry and vegetable production.

NITROGEN MANAGEMENT IN STRAWBERRIES

Amongst those challenges is how to deliver nitrogen (N) and other critical inputs to developing plants when they most need them, while at the same time protecting surface and groundwater from nutrient runoff.

Finding the optimal N application rate and timing can be particularly tricky in organic strawberry systems, where the plants' nutrient needs stretch over a long growing season. Many organic inputs, including compost and cover crops, take time to break down and release nutrients to the soil and plants; coordinating nutrient availability with the plants' development is critical.

Working with Mark Bolda of UCCE, Muramoto examined several strategies for both pre-plant, or basal applications of N, combined with supplemental N inputs, with the goal of making the nutrient available to the plants when they most needed it in an approach that was also cost effective for growers.

In a study based at the Farris Ranch in Watsonville during the 2007–2008 cropping season, Muramoto compared inputs of 0, 75, and 150 pounds of nitrogen per acre, applied as a basal application in the form of blood meal. A liquid N supplement (Phytamin) totaling 0, 150, or 300 lbs of N/acre was also applied via drip tape fertigation during March and October at an application rate of 0, 10, or 20 lbs/acre

over a 2-week period. In addition, 6.2 tons of compost/acre were applied prior to planting the strawberries. The site has a Canejo loam soil type.

In the Farris Ranch study Muramoto found that 300 pounds of supplemental fertilizer offered the best return in terms of fruit yield, fertilizer cost, and minimal nitrogen loss to the environment. The amount of basal or pre-plant nitrogen applied did not affect yields, and may have in fact been leached from the system early in the growing season.

Conversely, Muramoto saw nearly the opposite results from a 2008–2009 study using the same treatments at the Mann Ranch, a Watsonville site with soil relatively high in clay. There, plants that received a pre-plant application of blood meal have yielded significantly more fruit than those receiving no blood meal input; the different supplemental fertility treatments with Phytamin have not affected yields.

"The difference may be the heavy rain we had last year versus this year," says Muramoto, "combined with this season's relatively warm winter conditions."



Field assistants Alicia Fitzgerald and Colin Brown from UC Santa Cruz collect data at the Farris Ranch in Watsonville for a study on nitrogen dynamics and crop response.

Joji Muramoto

Apparently, the warmer, drier conditions in the 2008–2009 season increased the importance of the basal fertilizer, with plants absorbing the pre-plant nitrogen early in the growing season and responding with better yields, as they do in the Santa Maria region farther south (see below).

Muramoto notes that although the 2008–2009 study is still in progress, initial results suggest some basic N management approaches for strawberry growers. First, pre-plant nitrogen can be much more effective in heavier soils compared to lighter soils. Second, in lighter soils, basal applications of N should be minimized to reduce potential N losses during the rainy winter season. If winter conditions are warm and dry, growers should begin supplemental fertigation as early as possible.

In a similar experiment located in Santa Maria (Santa Barbara County), Mark Gaskell, a Cooperative Extension farm advisor, also looked at the response of organic strawberry plantings to different nitrogen input regimes.

Gaskell noted the critical role that nitrogen plays in the early development of the region's strawberry plants, which translates to increased yields throughout the season. As he explained, "It's very important to have nitrogen available early in the season in order to set the stage for the number and size of crown shoots, which will influence later yields. The period between December and February, when differentiation of crown shoots occurs, is a critical time for nitrogen uptake."

Because nitrogen from pre-plant organic matter such as cover crops and compost reach their maximum availability at 4–8 weeks after incorporation, long-season crops such as strawberries may need additional periodic inputs of N in order to maximize production. Gaskell compared weekly applications of 6, 12, and 18 lbs/acre of N to test the response of the plants.

Gaskell was surprised to find relatively little response in terms of plant growth and yield to the N applications, until he discovered that the N was being injected into the drip lines ahead of irrigation cycles, and essentially being "washed out" of the system before the plants could use it. Chalking this initial result up to "the vagaries of on-farm experimentation," Gaskell is now carefully monitoring the N and water applications, again comparing 6, 12, and 18 lbs/acre/week of N inputs, and expects to see a "cleaner" N response by the plants.

DEVELOPING NITROGEN BUDGETS

Growers face a balancing act when deciding how much nitrogen to apply to a crop: too much and nitrogen may be lost from the system through leaching, representing both an economic and environmental cost; too little, and the crop may not perform well.

UC Santa Cruz researcher Katie Monsen and professor Carol Shennan are interested in developing N budgets for growers to use in calculating an overall N balance for their system; such a balance represents N inputs in the form of fertilizers and nitrogen fixed by cover crops, minus N outputs via plant uptake plus any changes in soil N storage.

Achieving a balance between N inputs and outputs can optimize a grower's use of nitrogen while protecting the environment.

As part of the Organic Network effort, the researchers analyzed the contribution that winter cover crops make to N input in organic vegetable systems. Monsen reported on a study that took place at the UCSC Farm and two organic farms in Watsonville, examining the relationship between a site's existing fertility and the amount of N contributed via nitrogen fixation from the atmosphere by legumes grown as cover crops.

"Our assumption was that 'legumes are lazy' and don't fix as much N when the soil is already fertile," said Monsen. "We were surprised to find relatively high levels of N fixation by bell beans and vetch on sites where soils had high levels of plant-available N."

The researchers confirmed this field observation with greenhouse pot experiments in which the organic fertilizer Phytamin was added to the soil at rates of 0, 75, or 200 kg N/ha (0, 67, or 178 lbs/ac). According to Monsen, they found that legumes have active root nodules (the sites where N fixation takes place) early in their growth, even under high fertility treatments, and fix N at rates much higher than the "50%" rule of thumb normally used in calculating N contributions from legume cover crops.

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Katie Monsen

UCSC undergraduate research assistant Angela Fotnik with the pot experiment used to confirm field observations of higher-than-expected nitrogen fixation levels by legumes growing in relatively fertile soil.



UCSC undergraduate Dylan Seidner tends the developing bell bean and vetch cover crop mix at the UCSC greenhouse. The plants were analyzed to determine how different levels of soil fertility affect N fixation by the cover crops as they developed.

In explaining the “50% rule,” Monsen said that growers and researchers commonly assume that legumes obtain 50% of their total N from the soil and 50% through fixation of atmospheric nitrogen. Monsen and Shennan’s work shows that legumes can in fact fix N at higher rates and therefore contribute more N to the system than was once thought.

Monsen notes that underestimating the amount of N contributed by legumes can lead to higher N losses from the system, as growers may be applying more supplemental nitrogen in the form of cover crops and fertilizers than the crop can effectively use.

Based on this finding, Monsen and Shennan are updating nitrogen budget calculations to reflect the higher amount of N contributed by legume cover crops. They have been using these calculations to create worksheets growers can use in developing nitrogen budgets for their cropping systems.

CALCULATING NITROGEN INPUTS FROM COVER CROPS

As noted above, many organic and conventional growers rely on cover crops to supply a portion of the fertility needs for subsequent crops. As part of the Organic Research Network’s nutrient management work, UCCE farm advisor Richard Smith and CASFS researcher Joji Muramoto examined the nitrogen contribution of a legume/cereal cover crop to a subsequent crop of organically grown broccoli. The two-year study took place at the CASFS organic farm at UC Santa Cruz, and at the Hartnell Agricultural Research Station in Salinas.

During the workshop, Smith explained that maximum nitrogen uptake by crops such as broccoli and lettuce occurs in a compressed time period from approximately 30–60 days into the growing season. Although cover crops can provide some of a crop’s N needs, additional fertilization may be required to meet the crop’s demands.

Smith and Muramoto tested the response of a broccoli crop in plots with and without cover crops, and with and

without additional nitrogen inputs, comparing inputs of 0, 75, 150, and 225 lbs N/acre applied as feather meal.

At the UCSC Farm, which has been organically managed since 1971, Smith found a one ton/acre increase in broccoli yield with the cover crop, which contributed 80 lbs of N/acre to the soil. Smith calculated that the broccoli used 23% of the N contributed by the cover crop. He also saw a 1 to 1.5 ton/acre yield increase with the 150 and 225 lbs N/acre fertilizer treatments.

In the 2006 Salinas trial, Smith also reported higher yields from plots that had been cover cropped, with an N uptake 27 lbs/acre greater in the cover cropped plots. Conversely, they saw lower broccoli yields in 2007 in the cover cropped plots at the Salinas trial; this was likely the result of a freeze that limited legume growth, and thus decreased the amount of N that the cover crop contributed to the subsequent broccoli crop.

Smith emphasized that particularly in sites without adequate soil fertility, growers cannot necessarily rely on cover crops alone to produce economically viable yields. And because the timing of N mineralization from cover crops may not match the crop’s peak demands, some supplemental fertilizer may be needed to optimize yields.

Reflecting on his experiences with the Organic Research Network, Muramoto said, “It has been a great experience to work with local organic growers and researchers. Thanks to the project, the network among researchers and growers became much stronger and we are looking forward to the next step and the possibility of extended collaborations.”

More information on the research described in this article and other projects presented at the workshops is available at www.agroecology.org/seminar.html.



Members of the Organic Research Network: top row, from left – Tara Pisani Gareau, Carol Shennan, Karen Klonsky, Steve Gliessman; bottom, row, from left – Sean Swezey, Richard Smith, Craig Ficenece, Steve Koike, Viella Shipley, Steve Pedersen, Joji Muramoto.

New Project Evaluates Businesses as Catalysts for Food Systems Change

Businesses that are socially and environmentally responsible as well as profitable can help bring about positive changes in the food system. Center researcher Rebecca Thistlethwaite is developing case studies of such businesses in a project aimed at highlighting successful elements both unique to and shared by these organizations.

“We want to provide information so that others can learn from and potentially replicate aspects of these ‘triple bottom line’ businesses that take into account people, planet, and profit,” says Thistlethwaite. “Ultimately we’d like to help others scale up these models and practices so that socially and environmentally responsible businesses are the norm, not the exception.”

With support from the Eucalyptus and Appleton foundations, and a U.S. Department of Agriculture grant, Thistlethwaite is developing case studies of 12–15 businesses around the country with diverse ownership structures at different levels of the food system “from seed to table.” Businesses studied will include nonprofits, investor-owned corporations, co-ops, and other business models, and she is making a special effort to include those that are owned by women and minorities.

In developing her criteria for the study, Thistlethwaite included businesses that have some methodology for evaluating the triple bottom line. “It has to be measurable,” she explains. “The business can either use some internal evaluation system or external certification such as The Food Alliance, Organic, or Fair Trade.”

To identify businesses to profile, Thistlethwaite assembled an advisory committee of business leaders, farmers, and researchers from around the country that helped her develop a list of potential candidate businesses.

“I also did extensive internet research looking at businesses that are certified through various external certifications, finding business owners who had received a lot of media attention for their effort, and going through conference documents to see who had been invited as guest speakers or served on panels and are considered leaders in their fields, along with some word of mouth networking,” she says, adding, “I also wanted to identify women and minority-owned businesses, as these tend to be underrepresented in similar research efforts.”

After completing interviews with business owners this summer, Thistlethwaite will write up case study narratives, which will be posted to the Center’s web site as they’re completed. “When we’re all done, we’ll create a toolkit highlighting key innovations, and the nuts and bolts of how others can replicate these business practices.”

Labor Inequalities in the U.S. Food System Examined

Center director Patricia Allen and Carolyn Sachs of Penn State University have received a \$160,000 grant from the National Science Foundation’s Sociology Program to study the ways that class, race, and gender influence inequalities in the food and farming industry. The project, “Gender and Labor in the U.S. Food System,” will examine some of the reasons behind the statistics that show significant inequalities in the U.S. food labor sector that are patterned along lines of gender, race, and class.

The research will include individual interviews and group conversations with men and women employed in the food industry, such as farmers, farm workers, and restaurant workers, to address questions of how patterns of inequality are reproduced, how social disparities are experienced, and how the social categories of class, race, and gender interact to produce inequity.

Allen and Sachs believe that particular structures of the reproduction of inequalities in food work are based on the intersections of paid and domestic labor, and that practices that support these structures of inequalities can be categorized. They hope to identify leverage points for change in order to address issues of inequality.

USDA Grant to Support University-Community Partnerships

A special project grant of \$332,000 from the U.S. Department of Agriculture will support a variety of Center efforts to increase sustainability by developing university-community research and education projects.

The three main objectives for the 2009–2010 project are to increase community-university partnerships for studying and designing sustainable food systems in the Central Coast region; expand knowledge and research capacity on sustainable food system ideas and practices among univer-

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sity students, staff, and faculty; and increase understanding of the role of urban agriculture and local food systems in improving sustainability in the region.

Examples of work that will take place as part of the grant include research on the food system-related priorities of community organizations; research on innovative food system economic models; new UC Santa Cruz classes on food system issues; funding for graduate work that will help create a more sustainable food system on the Central Coast; an assessment of urban agriculture's contribution to food security and ecological sustainability in the region; and an assessment of ways that local food systems contribute to sustainability in the Monterey Bay region.

Role of Social Justice in "Buy Local" Campaigns Examined

"Buy Local" has become the watchword of many groups working for a more sustainable food system. Center director Patricia Allen has been examining the role of social justice in these efforts that encourage shoppers to buy locally grown food with the goal of supporting and building local food systems.

Allen's work with C. Clare Henrichs of Penn State University, and with Alice Brooke Wilson of the University of North Carolina, Chapel Hill, concluded that "buy local" campaigns have the potential to dovetail with "domestic fair trade" efforts (*see page 3*) that address social issues such as working conditions in the food system, and may help to redress some of the social inequities precipitated by agriculture's globalization by reconnecting consumers with the source of their food. Allen and Wilson write, "Rather than a localism based on romantic essentialism or one that reads local as good and global as bad, local food movements can partner with other regions to address inequality and the policies that create and foster it."

The Center also initiated interviews with 43 representatives of "Buy Fresh, Buy Local" programs in 2008. The goal of this effort, slated for completion in 2009, is to better understand the motivations and assumptions behind promoting local farming efforts as a strategy for addressing problems in the food system, and to identify innovative ways that various groups across the U.S. are promoting efforts to "buy local."

For more information on Allen's work on local food-buying campaigns, *see* –

Allen, P., and A. B. Wilson. 2008. Agrifood inequalities: globalization and localization. *Development* 51 (4). Special issue: The future of agriculture.

Hinrichs, C., and P. Allen. 2008. Selective patronage and social justice: local food consumer campaigns in historical context. *Journal of Agricultural and Environmental Ethics*. 2:329–352.

Field Trials of Methyl Bromide Alternative Show Promise

Center researcher Joji Muramoto and faculty affiliate Carol Shennan are fine-tuning a method to suppress disease organisms and weed seeds without the adverse effects of the ozone-depleting soil fumigant methyl bromide.

Muramoto is working with researchers and growers in California and Florida on a technique called anaerobic soil disinfestation (ASD) that uses local carbon sources such as rice bran, onion skins, molasses, and poultry litter, along with ethanol. When worked into the soil, irrigated, and covered with a tarp for 2–3 weeks, the carbon, ethanol, and water combine to enhance microbial growth and create anaerobic soil conditions that can kill weed seeds and propagules of disease-causing organisms such as *Verticillium dahliae*.

Muramoto reports promising results from the 2008 work in Florida in suppressing weeds with the ASD technique, as well as in California in reducing *V. dahliae* in soils with high clay content. Further studies will include determining the optimum irrigation rate for a given soil type in California in order to use ASD effectively.

For more information on this study, *see* –

Muramoto, J., et al. 2008. Effect of anaerobic soil disinfestation on weed seed germination. Proceedings of the Annual International Research Conference on Methyl Bromide Alternatives and Emissions Reductions: 109.1–109.3.

New "Crops at Risk" Grant Funds Lygus Control Effort

A grant from the U.S. Department of Agriculture's Crops at Risk program will fund the efforts of Center researchers Sean Swezey, Diego Nieto, and Janet Bryer to better understand the springtime movement of *Lygus hesperus*, one of the strawberry industry's most destructive pests (*see cover story*).

The research, which will take place in both organic and conventional strawberry fields on the Central Coast, will emphasize trap crop-based pest management techniques that can decrease reliance on insecticide sprays and are broadly applicable to cropping systems in which *Lygus* spp. cause economic damage.

The project will focus on the techniques of managing alfalfa trap crops to intercept lygus as they migrate from areas surrounding strawberry fields in the spring. According to the researchers, alfalfa trap cropping's greatest potential as a lygus management tool may be during this period, when the issue of plant host preference is most relevant.

Due to the strong attraction lygus male and female adults have to alfalfa, trap crops intercept these immigrants, preventing them from immediately establishing populations in springtime strawberry fields. The trap crops can be treated with a "bug vac" or insecticides to reduce lygus populations at this critical stage, and minimize their movement into adjacent strawberry crops.

The researchers' goal is to demonstrate the efficacy of this approach to limiting lygus populations, and to extend this information to growers via grower workshops developed in collaboration with the Central Coast Agricultural Water Quality Coalition. The project's outreach efforts will place a special emphasis on Spanish-speaking strawberry growers who make up a significant percentage of the Central Coast industry, yet are often exposed to fewer management alternatives due to language barriers.

Less Irrigation Makes for Similar Yields, Tastier Tomatoes

In 2008, Center farm manager Jim Leap and UC Cooperative Extension farm advisor Aziz Baameur established a study of water use in organic tomato plantings to test the effects of various irrigation treatments, with the goal of finding an optimum water-use strategy that would result in improved flavor while minimizing potential yield losses.

Baameur and Leap established four replicates each of five irrigation treatments: 100%, 75%, 50%, 25% and 0% of water requirements based on California Irrigation Management Information (CIMIS) recommendations. Each replicate consisted of a 40-foot row of 'Early Girl' variety tomatoes irrigated with drip tape; the water stress treatments began after the plants were established. Soil water moisture sensors (a type of tensiometer) were used to quantify water depletion at the root level.

Results of the 2008 study showed no significant yield differences across the water treatments. According to Baameur, "The 'Early Girl' variety showed remarkable plasticity to water stress. All treatments produced respectable yields of between 19,000 and 21,000 pounds per acre." Plots receiving 100% and 75% of the water requirements produced a higher percent of larger fruit, and Baameur found that fruit from the driest plots exhibited a higher incidence of sunburn, blossom-end rot, and insect and disease presence than those receiving more water. According to Leap, the increased incidence of disease and pests in the low-water plots may have in part reflected a later-than-usual planting date.

Three tasting panels of 44 participants preferred the taste of tomatoes from water-stressed plots compared to those grown with ample water. Similarly, the panels found more appealing fruit aroma in tomatoes receiving the low water treatment. Says Baameur, "In general, stressed plots produced fruit that tasters favored in terms of flavor, aroma, appearance, texture, and overall fruit quality."

Laboratory analyses confirmed most of these sensory preferences. According to Baameur, glucose and fructose concentrations were highest in the tomatoes from plots receiving 0% and 25% of recommended water requirements (48 and 47 mg/L, respectively) and significantly decreased as water input increased. The dry weight and soluble solids showed similar trends. Ascorbic acid content, pH, and titratable acidity were not significantly different among treatments.



Martha Brown

UC Cooperative Extension farm advisor Aziz Baameur (left) and Center Farm manager Jim Leap discuss the tomato irrigation trial at the UCSC Farm.

Recent Publications

Work by members and affiliates of the Center for Agroecology and Sustainable Food Systems has led to a number of recent publications.

From CASFS director Patricia Allen and former CASFS researcher Phil Howard, now on the faculty at Michigan State University—

Allen, P. 2008. Farm to institution programs. Family Farm Forum, USDA CSREES. Nov. 2008. http://www.csrees.usda.gov/nea/ag_systems/pdfs/Update%20on%20Local%20Food%20Systems_1108.pdf

Allen, P. 2008. Mining for justice. *Agriculture and Human Values*. 25:157–161.

Howard, P. and P. Allen. 2008. Consumer willingness to pay for domestic 'Fair Trade:' Evidence from the United States. *Renewable Agriculture and Food Systems* 23(3), 235–242. Cambridge University Press.

From CASFS extension specialist Sean Swezey and research associates Janet Bryer and Diego Nieto—

Pickett, C. H., S. L. Swezey, D. J. Nieto, J. A. Bryer, M. Erlandson, H. Goulet, and M. D. Schwartz. 2009. Colonization and establishment of *Peristenus relictus* (Hymenoptera: Braconidae) for control of *Lygus* spp. (Hemiptera: Miridae) in strawberries on the Central California Coast. *Biological Control* 49: 27–37.

From Environmental Studies professor Carol Shennan and researchers Joji Muramoto and Katie Monsen —

Shennan, C., J. Muramoto, and K. Monsen. 2008. Optimizing nutrient management BMPs in strawberry and vegetable production. Final report to the Community Foundation of Monterey County.

Center Notes

UC Small Farm Program Honors Center Farm Manager Jim Leap

The 2009 Pedro Ilic Awards from the University of California's Small Farm Program honored Center farm manager Jim Leap as the year's Outstanding Educator. The awards are named for the Fresno County small-scale farm advisor whose untimely death in 1994 prompted the UC Small Farm Program to annually honor those who carry out his legacy of personal commitment to small-scale and family farming.

As farm manager at UC Santa Cruz, Leap's role over the last 19 years has included teaching in the six-month Apprenticeship program, overseeing the farm's research trials, cooperating with outside researchers, contributing to training publications, and sharing information with visitors, students and farmers. Leap also serves as a mentor to many of the Apprenticeship course graduates, who look to him for advice as they launch their own farming careers.

Former apprentices and current farmers Nancy Vail and Jered Lawson, of Pie Ranch near Pescadero, were among those nominating Leap for the award. "We, along with many other past UCSC apprentices who are now small-scale farmers, owe so much to Jim Leap," Vail wrote.

Before working for the University of California, Leap spent 15 years farming in Fresno where he worked closely with farm advisor Pedro Ilic. Leap credits Ilic for encouraging him to pursue a career in agricultural education.

Jim Leap has been a leader in training new farmers and refining organic farming techniques during his 19-year career as manager of the Center's organic farm at UC Santa Cruz.

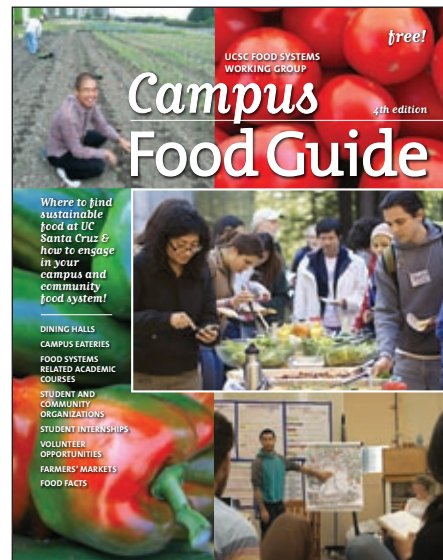


Alix Blair

New UCSC Campus Food Guide Available

Looking for a place to grab a meal or snack at UCSC? Interested in classes that address food systems issues? Want to do some gardening for credit? The fourth edition of the *Campus Food Guide* offers the UCSC campus community a wealth of information on many food-related issues, including Dining Services' latest "green" dining options, updates on efforts to make the campus food system more sustainable, and a list of courses, internships, and volunteer opportunities for students interested in farming, gardening, and social aspects of the food system.

The free 38-page publication produced by the Center for Agroecology & Sustainable Food Systems is available at public spaces throughout campus, including libraries, coffee shops, and college offices. You can also request a copy by calling 459-3248, or find a pdf version on the web at <http://casfs.ucsc.edu/farm2college/index.html>.



Center's Market Cart Now Accepting EBT Credit

The UCSC Farm & Garden Market Cart sells fresh-picked organic fruits, vegetables, and flowers on Tuesdays and Fridays from 12 noon to 6 pm at the base of the UCSC campus from early June through mid October.

Thanks to the efforts of farm production manager Liz Milazzo, we are now able to accept EBT credit that allows community members to use their benefits from SNAP (Supplemental Nutrition Assistance Program). The Center joins other Santa Cruz-area farmers' markets in offering this service to customers.

Apprentice Grad Wins White House Farmer Contest

Claire Strader, a 2000 graduate of the Center's Apprenticeship in Ecological Horticulture, won the online White House Farmer campaign, beating out 110 other nominees for the position. Claire manages Troy Community Farm, a 5-acre urban farm in Madison, Wisconsin serving local community members with a CSA program, farmstand, and through retail sales.

In just 10 days, nearly 56,000 voters weighed in on this grassroots effort to encourage the new administration to make writer Michael Pollan's call for a White House Farmer a reality, and to support sustainable local food systems. Read more about the contest at www.whitehousefarmer.com.

Apprenticeship course graduate Claire Strader (in hat) with members of the Troy Community Farm.



Center Expands Community Education Offerings

The Friends of the UCSC Farm & Garden are a 650-member community support group dedicated to public education and to raising funds for the Center's Apprenticeship program and Farm & Garden facilities. Each year the Friends work with Center staff to offer a year-long series of home gardening workshops and seasonal celebrations, reaching the Monterey Bay community with information on organic gardening, orchard care, and sustainable food systems.

In response to increasing public interest in home food production, members of the Friends' board of directors joined with Center staff to develop an expanded set of community gardening classes for the 2009 season, including a fruit tree care series and a "Victory Garden" series ([see http://casfs.ucsc.edu/community/calendar.html](http://casfs.ucsc.edu/community/calendar.html)). These classes drew enthusiastic crowds throughout the year. Planning for 2010 programs is now underway and the 2010 events schedule will be posted to the above website in early December.

Friends of the Farm & Garden Produce Poetry Anthology

The Friends of the Farm & Garden are proud to announce the publication of the Chadwick Garden Anthology of Poets. This anthology of 31 writers who have taken part in the Friends' annual Poetry and Music in the Alan Chadwick Garden event over the years brings together the work of some of the region's finest poets, including local favorites Patrice Vecchione, Gary Young, Nate Mackey, Kathleen Flowers, Amber Sumrall, and Stephen Meadows.

The 134-page anthology is available for \$20 (tax and shipping included) from the Friends of the UCSC Farm & Garden. To order your copy, send a check made payable to UC Regents to: Friends of the Farm & Garden, 1156 High St., Santa Cruz, CA 95064, attn: Poetry Book. You can also find the anthology at Bookshop Santa Cruz, the Capitola Book Café, and at UCSC's Baytree Bookstore.



2010 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, along with information on social issues in sustainable agriculture (see sidebar, next page). 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.

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, sharing cooking and other community responsibilities in a common kitchen/dining facility. Tuition is \$4,800 and 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, 2010. Application deadlines for the 2010 program are September 15, 2009 for international applicants

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and October 15, 2009 for U.S. and Canadian citizens. For more information, please see our website at <http://casfs.ucsc.edu/training/index.html> or contact us at (831) 459-3240, apprenticeship@ucsc.edu.

The Social Justice Advocacy Committee

Along with learning the practical skills needed to grow and market food at a variety of scales, apprentices also learn about the myriad social issues involved in the food system. In response to the interest in social justice that many apprentices have or develop during the program, the Apprenticeship initiated a Social Justice Advocacy Committee (SJAC) in 2003 to encourage and integrate social justice and diversity within and beyond the Apprenticeship Program.

In addition to monthly discussion forums on topics such as women in agriculture, migrant labor, and people of color and agriculture, SJAC members and apprentices work with staff of the Center and of the Life Lab Science Program to coordinate on-farm events for youth groups, and to organize an annual Labor Day activity to improve understanding of labor issues in agriculture.

Graduates of the 2008 Apprenticeship course are already making their mark, particularly in programs that combine food production with social justice work. Brent Walker was hired to manage the Sunol Farm of the People's Grocery project, growing food for East Bay communities in the San Francisco region; Karen Washington is working with the Garden of Happiness and La Familia Verde in the Bronx, New York; Shereen D'Souza now heads the California Food and Justice Coalition, based in Berkeley; and Steve Munno, who graduated from the 2007 Apprenticeship and served as a course assistant in 2008, is farm manager for The Food Project, based in Boston.



Artist's rendering of one of the nine cabins to be built at the UCSC Farm for participants in the Center's Apprenticeship training program, funded in large part by the successful Grow a Farmer campaign.

Grants & Gifts Support Center's Work

In addition to the generous support from individuals, businesses and foundations that have donated to the Center's Grow a Farmer campaign (*see page 7*), a number of other grants and gifts have funded work at the Center this year. We are grateful to the following foundations and families for their support –

- True North Foundation, \$45,000
- Anonymous Foundation, \$40,000
- Stanley Smith Horticultural Trust, \$13,000
- Nalith Foundation, \$2,500
- Simply Organic Scholarship, \$5,000
- Cowan Family, \$173,423
- Appleton, \$25,000
- Foundation for Global Community, \$100,000
- Eucalyptus Foundation, \$50,000
- Seed Fund for Urban Projects, \$10,000

New Staff on Board

The Center welcomed two key staff members over the past year. Rebecca Thistlethwaite joined us as an associate specialist in social issues. Her background includes a master's degree in international agricultural development from UC Davis, work on a variety of organic farms, research in Guatemala and Honduras, and training new farmers at the Agriculture and Land-Based Training Association in Salinas, California. Along with her work at the Center, she also raises and markets livestock as co-owner of TLC Ranch.

We are also pleased to welcome George Brown as associate director of the Center's Living Lab activities, including the Apprenticeship training program and natural science research. An emeritus professor of physics, Brown brings both passion for the Center's work and a wealth of administrative skills and experience to the job, including a tenure as UC's Vice Provost of Academic Affairs. He also continues to teach for UCSC's Physics Department.

CASFS Photo Collection



Brent Walker, a member of the 2008 Apprenticeship class, stakes tomatoes at the UCSC Farm. Walker now manages the Sunol Farm in the San Francisco Bay Area.

Center Expands Opportunities for UC Undergraduates

The Center continues to respond to burgeoning student interest in a greener, more socially just food system, supporting new courses, internships, and educational events focused on sustainable food and farming both at UC Santa Cruz, in the Monterey Bay region, and at other UC campuses. Recent highlights include –

The Agroecology Practicum. Offered for the first time in 2008, this UCSC Summer Session course taught by researcher Katie Monsen combines lectures and demonstrations with field applications to give students direct experience and knowledge of sustainable agriculture and horticulture. The UCSC Farm & Garden served as the living laboratories for the course, where students test agroecological principles, conduct field trials, and work with the Center's Apprenticeship staff to learn about organic farming, gardening and marketing practices. Both sessions of the 2009 summer course were fully enrolled on the first day of registration.

Harvest for Health. Working with first-year students from UCSC's College 8, the Harvest for Health program brings freshmen to the campus's Farm to get them thinking about their own connections to the food system. Center field production manager Liz Milazzo and Center Apprenticeship course member David Evershed worked with more than 200 students during the fall quarter, introducing them to sustainable agriculture and agroecology concepts and helping them harvest food for their dining halls.

Undergraduate Internships. Each quarter the Center offers undergraduates the chance to work with staff at the UCSC Farm & Garden, the Life Lab Science Program's Garden Classroom, or on various Center research projects through internships. During the 2008–2009 school year, more than 90 interns led tours for visiting school groups, helped market produce from the Farm to campus restaurants, and grew food and flowers at the Farm and Alan Chadwick Garden while learning organic farming and gardening techniques.

UC Food Systems Working Group. In 2008, this UC systemwide advisory group introduced a new sector in the UC system's statewide sustainability policy by creating and implementing clear guidelines that prioritize local, organic, humane, and socially responsible purchasing, as well as waste reduction and green dining facility standards. Center staff took part in helping craft these guidelines, which build on the Food Systems Section of UCSC's Campus Sustainability Assessment (see <http://sustainability.ucsc.edu/assessment> for details).

Sustainable Agrifood System Internships. Center researcher Tim Galarneau coordinated undergraduate students at six University of California campuses as part of the 2008–2009 Sustainable Agrifood System (SAS) internship program, funded by a USDA grant. The interns assessed information needs and opportunities for educational efforts and policy changes that would improve students' agricultural literacy and make their campus food systems more sustainable. In addition to support through the SAS internship, the students received over \$20,000 in research funds from their campuses to enhance the sustainability of campus food systems.

Food System Learning Journeys. Center researcher Tim Galarneau teamed with the campus's Office of Recreation and UCSC's Food Systems Working Group to design this new program, offered in 2008–2009. UCSC students signed up each quarter through the recreation department for "Learning Journeys" to food processing plants, farmer's markets, local farms, restaurants, and recycling facilities to learn about both the campus and regional food system.

Campus Food Guide. The fourth edition of this free guide (see page 16), developed by the Center and members of the UCSC Food Systems Working Group, offers the campus community a resource for learning about sustainable agriculture classes, internships, and volunteer opportunities, as well as offering a guide to local farmers' markets and businesses that specialize in local, organically produced food. Ten thousand copies of the guide are being distributed to campus and community members, including all first-year UCSC students as part of their orientation programs.

Campus Educational Events. Working with Dining Services staff, Center researcher Tim Galarneau organized several organic College Nights at UCSC dining halls in 2008 and 2009, giving more than 3,000 students the chance to meet members of the Monterey Bay Organic Farmers' Consortium (MBOFC) and enjoy a meal featuring locally produced organic products. The MBOFC network of seven local farms grows food for campus cafeterias and restaurants (see related article, page 3).

Galarneau and other members of the Food Systems Working Group also helped Dining Services launch a "trayless dining" program in campus dining halls in the fall of 2008. By eliminating cafeteria trays, the program will save up to 18 tons per year of uneaten food waste as well as a million gallons of water annually.

Agricultural Justice Project

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AJP EFFORT INITIATED ON THE CENTRAL COAST

Recently, efforts to develop a third-party, domestic fair-trade pilot certification have been initiated on California's Central Coast. This certification would represent just treatment for farm workers and economic viability for small- and medium-scale organic farmers (*see details, below*). Already established in the Midwest and being piloted in the Southeast, the Agricultural Justice Project (AJP) certification has begun to lay the groundwork for a California premier that will focus on the Monterey Bay region.

Michael Sligh of the Rural Advancement Foundation International (RAFI-USA) and Sandy Brown of Swanton Berry Farm introduced the AJP to the Monterey Bay region at the January 2008 Ecological Farming Association conference; several months later, a meeting was held with the Monterey Bay Organic Farmers Consortium to discuss opportunities for initiating a pilot program.

BUILDING LOCAL MARKETS FOR THE AJP: UCSC AND THE MONTEREY BAY ORGANIC FARMERS CONSORTIUM

If AJP-certified products are to be successful in producing positive changes in farming practices, they must be supported

by market demand. A powerful way to establish ongoing interest for these products is to market them to institutions and gain access to their significant purchasing power. However, access to institutional markets such as UCSC has typically been beyond the capacities of the small- to mid-scale organic growers targeted by the AJP. These growers face challenges in meeting the volume, consistency, variety, and price needs of institutions, leaving this profitable arena to larger farm operations and distributors.

Addressing these challenges led to the creation of the Monterey Bay Organic Farmers Consortium (MBOFC) in 2004, a collective of seven regional growers who work together to meet institutional purchasing demands and who now supply local, organic produce to UCSC's dining halls, cafés, and restaurants. These are also the growers that the AJP hopes to enroll in their West Coast pilot program.

Center staff and interns helped initiate a discussion with MBOFC members in the fall of 2008 to lay the groundwork for AJP's establishment. After some concerns and challenges were addressed, many of the growers voiced their interest in participating in the AJP. Center members have also worked to integrate student learning and action into efforts to establish a West Coast AJP pilot program with the seven MBOFC member farms.

The Agricultural Justice Project Certification

The AJP certification label would offer food purchasers a way to address the problem of social justice through a third-party certified, market-based label. By supporting the AJP, consumers would become active in two ways.

First, they would be funding organic farms that embrace the principles of just working conditions and fair treatment for farm workers, thus supporting these ethics as well as farmers' livelihoods.

Secondly, they would create demand for items that represent these values and thus generate a greater supply of organically-grown, social justice-certified products.

A comprehensive implementation of social justice via standards is challenging, but the AJP intends to demonstrate its principles by ensuring all of these benchmarks:

- Farmers and workers' rights to freedom of association and collective bargaining
- Living wages and fair benefits for workers
- Fair pricing for farmers
- Fair and equitable contracts for farmers and buyers
- Clear conflict resolution process
- Workplace health and safety
- Farmworker housing (this includes tenants rights, protection from contamination, fair rent, and abiding by all employer-owned government housing regulations where they exist)

These standards resulted from the collaboration of a number of groups, including non-governmental organiza-

tions (NGOs), farmworker advocacy groups, producers, and certifiers, which began working towards the AJP initiative in 1999. This collaborative effort includes organizations such as the Rural Advancement Foundation International (RAFI-USA), El Comité de Apoyo a los Trabajadores Agrícolas (CATA), Northeast Organic Farming Association (NOFA), Florida Organic Growers/Quality Certification Services FOG/QCS, and Fundación RENACE, an organic producers association based in Bolivia.⁶

A process that included domestic/international forums and periods of public comments helped refine the standards, which were drafted to be consistent with social justice criteria used by the International Labor Organization and IFOAM, the International Federation of Organic Agriculture Movements.

At a "Social Justice in Organic Agriculture" public forum hosted by CASFS at UC Santa Cruz in June 2009, AJP board members introduced the pilot program, then discussed critical questions posed by the attendees. Some areas of the AJP that forum participants explored included: access (to the certification and to AJP-certified food), fair wages/prices, and challenges farmers might face in implementing the AJP standards.

Through such forums and multi-stakeholder discussions, the ten-year process of refining the AJP has ensured diverse input and provided a range of parties the chance to verify that the standards reflect meaningful components of social justice.



ALBA Organics acts as a distributor for a consortium of farms supplying UCSC Dining Services.

During this process the AJP has gleaned lessons from Sandy Brown, a representative of MBOFC member Swanton Berry Farm. Swanton Berry had undertaken a preliminary pilot in 2007 to help inform the development of the AJP standards. Brown says, “Our experience with the AJP certification process has been more accessible, straightforward and less time-consuming than we anticipated.”

As conversations with MBOFC farmers regarding the AJP have continued, the challenges that come with implementing a new certification process have become clear. Farms are faced with ever-increasing regulatory demands from local, state, and federal officials and certifying organizations. These may limit farmers’ abilities to pursue other social and environmental ventures. As Ken Kimes, co-owner of New Natives noted, “There are already so many agencies and organizations inspecting our operations that exploring another one may be too much, that is, unless it can show promising benefits.” These benefits include providing a greater market return in sales to producers, efficiency and simplicity in the certification process, and institutional and regional consumer support for the AJP certification.

And as small-scale rancher Rebecca Thistlethwaite of TLC Ranch points out, “Many small- and medium-scale farmers don’t have their own basic needs—including health care—covered by their farming income, and despite their desire to do so, improving labor conditions/benefits is often out of their reach.” Thistlethwaite, who also works as a research associate for CASFS, adds that with the economy not doing well, many consumers are foregoing organic products to save money and wonders, “Can producers afford to add an AJP premium onto their products to cover the real costs of labor at a time when consumers are pinching pennies and cutting back on their organic purchases?”

Despite these challenges, many MBOFC participants see the potential benefits of the AJP certification and are enthusiastic about its intent and ethics. They are also interested in better understanding the structure of their labor relationships and business practices as they pertain to social justice issues.

In June 2009, AJP board members Marty Mesh and Elizabeth Henderson visited Santa Cruz to meet with those

interested in the AJP pilot for the Central Coast region. They made two on-farm visits to help these operations foresee what the certification process would entail, and met with local organizations such as the Community Alliance with Family Farmers and California Certified Organic Farmers to gauge the potential for collaboration. Their visit helped clarify the AJP and allowed stakeholders to become more familiar with the people behind the AJP program.

CULTIVATING CONSUMER INTEREST IN THE AJP

The success of the AJP on the Central Coast will depend heavily on consumer interest. One avenue currently being explored is the potential for expanding existing business relationships between the MBOFC and UCSC. If the MBOFC farmers do become AJP-certified, UC Santa Cruz may be one of their biggest markets; by becoming certified, the growers would fulfill the “social justice and worker-supportive” criteria in UCSC’s sustainable food-sourcing guidelines.

Meetings and discussions with UCSC Dining personnel have helped growers understand the needs of those purchasing their products, and how the MBOFC may best meet those needs, while also allowing different parties to build trust with one another. As Tony Serrano, general manager of ALBA Organics (distributor for the MBOFC), has said, “A common cause like the AJP has helped to increase communication and improve relationships, making future co-operation much easier.”

In addition to UCSC, approximately 50 institutions are convenient to ALBA Organics’ existing delivery routes and could become future supporters of the AJP program. To increase awareness about farm-to-institution programs and connect these regional institutions to produce distributors like ALBA that represent social and environmental values, CASFS coordinated a Field-to-Fork event hosted at the UCSC Farm on June 2nd 2009. Those attending included K–12 food service directors, restaurant and corporate chefs, farmers, NGO members, and local produce distributors.

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Sandy Brown

Elizabeth Henderson (white cap) and Marty Mesh (green shirt) of the Agricultural Justice Project tour the ALBA farm in Salinas with Tony Serrano of ALBA Organics (dark cap) and UCSC intern Robert Seid.

The event helped attendees clearly envision what a farm-to-institution program would look like for their operation and connected them to the people that could be instrumental in establishing a program. Initiating these farm-to-institution efforts, and thus boosting demand for more sustainable food, may help create markets for AJP products.

Local retail markets that already embrace and advocate values of sustainability, such as New Leaf and Staff of Life, may also serve as outlets for AJP products by providing consumers with the ability to mobilize around issues of social justice. Finally, introducing AJP-certified products into direct marketing channels would give CSA and farmers' market clientele a way to support these domestic fair-trade efforts. As Santa Cruz Farmers' Market Manager Nesh Dillon says, "This is what we're all about and something our customers and growers could support in this region."

Working to enhance buyer and consumer education and awareness of the AJP certification and what it represents will be a key step in ensuring its success. As the AJP certification process continues, the Center will analyze levels of support from major purchasers and consumers and use this information to build market interest. The AJP may integrate with existing, regional food system organizations such as the "Buy Fresh, Buy Local" campaign and CAFF (Community Alliance with Family Farmers) to help communicate with consumers and growers about the AJP's efforts and goals.

By supporting a domestic fair trade certification like the AJP, individual consumers and institutional purchasers can financially support values of social responsibility and create demand for such products, just as they are able to do with certified organic and local foods. As momentum increases to advance sustainable agriculture principles and reform the food system, the AJP certification may ultimately help address the crucial tenet of social justice in organic agriculture.

— ROBERT SEID, TIM GALARNEAU

A grant from the True North Foundation helped support the participation of CASES in this work.

¹<http://ofrr.org/resources/organicfaqs.html>. Accessed March 14, 2009.

²<http://www.foodroutes.org/bfbl-chapters.jsp>. Accessed March 13, 2009.

³Mehta, K., et al. 2000. Findings from the National Agricultural Workers Survey (NAWS), 1997–1998: A demographic and employment profile of United States farmworkers. Washington, DC: U.S. Department of Labor.

⁴<http://www.sustainablefoodpolicy.org>. A Guide to Developing a Sustainable Food Purchasing Policy. Accessed July 27, 2009.

⁵Howard, Philip H. 2006. Central Coast consumers want more food-related information, from safety to ethics. *California Agriculture* Vol. 60, No. 1.

^{5a}Howard, P. and P. Allen. 2006. Beyond organic: consumer interest in new labelling schemes in the Central Coast of California. *International Journal of Consumer Studies* 30(5): 439–451.

⁶<http://www.agriculturaljusticeproject.org/standards.html>. Accessed March 10, 2009.

Lygus Marking Research

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According to Nieto, if the first generation of lygus can be eliminated each spring, then damage to the berries can be significantly reduced.

Pressures from industry and buyers over food safety concerns are prompting some growers to eliminate any wild vegetation in strips as wide as 30 feet around their fields. According to Nieto, such efforts do little or nothing to control lygus, and in fact may increase lygus damage to crops by eliminating the reservoir of vegetation that provides habitat for parasitoids that can help control lygus populations.

Results from this spring's sampling efforts are now being analyzed as the research team, including field assistant Clayton Winter, continues to monitor the effects of trap crops on berry damage through the summer and fall. A \$260,000 grant from the USDA's Crops at Risk program (*see page 14*) will fund additional work to help pinpoint springtime lygus movement and habitat preference over the next two seasons in order to develop more effective early-season lygus suppression strategies in both conventional and organic strawberry systems.

—MARTHA BROWN

Swezey, S.L., D. Nieto, and J. Bryer. 2007. Control of western tarnished plant bug, *Lygus hesperus*, Knight (Hemiptera: Miridae) in California organic strawberries using alfalfa trap crops and tractor-mounted vacuums. *Environmental Entomology* 36 (6): 1457–1465.



Diego Nieto

Scott Machtley sprays a stand of wild radish located across the road from strawberry fields at Eagle Tree Ranch. As the radish and other surrounding vegetation dry in the spring, lygus migrate to adjacent trap crops and strawberries.

***The Cultivar* Mailing List Update and Reader Survey**

Dear Reader,

We are updating the mailing list for *The Cultivar* and other Center for Agroecology & Sustainable Food Systems mailings, and we need to hear from you in order to keep you on our list. Because budget constraints may prevent us from continuing to distribute paper copies of the newsletter, we have also provided additional options for continuing your subscription to CASFS publications. We'd also like to hear from you about how we can improve our communications efforts—please take a minute to respond to the survey questions included here.

If you would prefer to respond to this update and survey online, please go to the CASFS website at <http://casfs.ucsc.edu> and look for **Cultivar Mailing List Update and Readership Survey** under the **Center Announcements** heading on the right side of the home page. Please note that if we do not hear from you we'll assume you are no longer interested in being included on the mailing list.

Thank you for your interest in sustainable agriculture and food systems, and for your help in improving our communications efforts.

☐ Yes! I wish to continue to receive *The Cultivar*

Check one:

- ☐ I am only interested in receiving a paper copy of the newsletter or other CASFS information, and have provided my mailing address below.
- ☐ I prefer to receive a paper copy of the newsletter or other CASFS information, and have provided my mailing address below; however, if no paper copy is available please provide me with an email alert when new issues are available (see below to provide email address).
- ☐ I prefer to receive an email alert when new issues are available and have provided my email address below.

Mailing address (to receive paper copies)

Name

Organization (optional)

Address/PO Box

City

State

Zip

Email address (please print legibly): _____

Reader Survey

How did you hear about *The Cultivar*?

☐ Online ☐ Conference ☐ Word of mouth ☐ Other (please specify)

The information in *The Cultivar's* articles is: ☐ too basic ☐ about right ☐ too technical

Have you ever visited our web site, <http://casfs.ucsc.edu>? ☐ Yes ☐ No

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Please rate your interest in the following types of articles on a scale of 1–42, with 1 = most interested and 4 = least interested

- _____ Research on food systems issues
- _____ Research on organic/sustainable farming methods
- _____ “How-to” information on organic farming techniques
- _____ “How-to” information on organic gardening techniques (including home, market, urban, and community gardens and orchards)
- _____ Innovative marketing strategies (e.g., Farm to College, Community Supported Agriculture)
- _____ Sustainable agriculture education information
- _____ Reviews of books and other resources on sustainable food and agriculture topics

I would like to see articles on the following topic(s): _____

Which of the following ideas do you think would make CASFS information more accessible to you and to a wider audience? (*check any that apply*)

- | | |
|---|---|
| <input type="checkbox"/> Regular newspaper column | <input type="checkbox"/> Website calendar |
| <input type="checkbox"/> Regular radio show | <input type="checkbox"/> Website facelift (http://casfs.ucsc.edu) |
| <input type="checkbox"/> Paper newsletter | <input type="checkbox"/> Workshops or public lecture series |
| <input type="checkbox"/> Email newsletter | <input type="checkbox"/> Produce more “how-to” publications |
| <input type="checkbox"/> Blog | <input type="checkbox"/> Others? Please specify _____ |
| <input type="checkbox"/> Facebook page | |

Should any CASFS publications be translated into another language? If yes, which publications?
 Which languages?

What is your primary/secondary occupation?

Optional contribution: I have enclosed a check made payable to UC Regents in support of *The Cultivar* and other CASFS publications. (Please see our website, <http://casfs.ucsc.edu>, for more ways to support the work of the Center for Agroecology and Sustainable Food Systems.)

Please return form to:

Martha Brown
 CASFS/UC Santa Cruz
 1156 High St., Santa Cruz, CA 95064
 Attn: Cultivar survey