



Small Farm News

Small Farm Program • Cooperative Extension • University of California



Extended family members harvest green beans at Fresno farm. Photo by Richard Molinar.

SFP advisor assists farmers working with family members

In 2005, Small Farm Program advisor Richard Molinar and assistant Michael Yang started receiving phone calls from local Hmong farmers alerting them to a serious problem.

"They were asking us, 'Is it safe to farm today?'" Molinar explained. "We received hundreds of these phone calls over the course of a few months."

The phone calls to the UC Cooperative Extension office in Fresno were based on confusion over fines levied on local farmers. State regulators had made some unannounced inspections of farms, looking for violations of labor code, safety and health regulations and payroll rules.

Family farmers – many of them Hmong and Hispanic immigrants – were fined for violations, up to \$36,000 for one of the farmers.

Word of the expensive fines traveled quickly through the farming community, raising the awareness of growers and farm advisors.

Many of the fines were related to family members working on the farm, either as volunteers or in exchange for future work. This practice is common among many refugee and immigrant farming communities.

While many farmers may think that family members can help

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Direct marketing: Add costs, then tally profits

Small-scale farmers have heard it often: Marketing directly to consumers cuts out the middle man. For a farmer used to selling at wholesale markets, the added profit available from selling at farmers-market prices may seem obvious. But beyond the extra jingle in their pocket, how many farmers have also added up the additional costs involved in doing their own marketing and distribution?

To examine the relative profitability of direct marketing options, Small Farm Program director Shermain Hardesty and Penny Leff conducted a case study of farms that sell to wholesale markets, at farmers markets, and through community supported agriculture programs (CSAs). In their paper, "Determining Marketing Costs and Returns in Alternative Marketing Channels," the two researchers calculated the costs and profits of these different types of marketing for three specific farms.

The researchers' first step was to list in detail the postharvest activities between the field and consumers.

"Farmers often think about the costs of growing a crop, but it's important to remember their marketing costs when it's time to tally up profits or

More info:

Full text of the research paper online at ucanr.org/hardesty/marketing-channels.pdf

decide on sales strategies," Hardesty said. "Listing every step involved in marketing a crop can be very useful."

The marketing activities were grouped into three categories: sorting and packing, transportation, and selling and administration. During interviews for the study, farmers were asked to talk through the sequence of events from harvest to sale. They also considered activities for each day of the week, during each season, and for each type of marketing.

Each marketing activity also included costs related to a combination of purchased goods or services, labor, and capital assets. Purchased goods and services includes such things as gas, packaging materials and utilities. Labor costs included

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Director's Message

Collaboration and diversification are key to small-scale success

We recently took the time to examine the Small Farm Program's efforts over the past twelve months, and published a very brief Annual Report. Sometimes it's necessary to reconsider your identity and goals to help determine the next step. I'm including in this column some of my insights from the Annual Report about the need for our program to be interdisciplinary and to collaborate with others—just like many of the small-scale farmers we work with.



Shermain Hardesty

The Small Farm Program's mission is to enhance the long-term viability of California's smaller producers, who are a very diverse group. Regardless of their backgrounds, smaller producers face challenges that are different than those addressed by many other Cooperative Extension programs. These producers cannot achieve economies of scale to compete as low-cost producers; instead, they must position themselves as niche marketers.

Thus, emerging specialty crops form the cornerstone of our program. While such crops offer potential for high prices, they also require significant research efforts. Almost by definition, there is no existing research or funding available from commodity boards to support these crops.

Most smaller producers are highly diversified to maximize their direct marketing opportunities. They have to be involved daily in all aspects of their farming enterprise, such as addressing

production issues (e.g., salinity levels and thrips damage), arranging workers compensation insurance for family members who work on the farm, monitoring packing shed activities for outgoing farmers market loads, negotiating with a new local grocery account and planning for planting new perennial crops. Small Farm Program advisors address issues related to all of these activities in their work with producers. They present their advice from an integrated perspective of the entire enterprise—recognizing such factors as a producer's language skills, lack of familiarity with various government regulations, distance from urban markets and limited transportation resources. From my perspective as an economist, their objective function is to maximize the producer's long-term profit subject to numerous constraints.

Collaborative efforts are key for the success of our program. To capitalize on our limited resources, the Small Farm Program advisors collaborate closely with each other, frequently engage cooperating

clients to aid in research, and work closely with various USDA agencies. Small Farm Program advisors collaborate with outside organizations such as Woodlake Pride, the Hmong-American Association of Fresno, California Rare Fruit Growers Association, CalPoly San Luis Obispo, and UCSC's Center for Agroecology & Sustainable Food Systems to strengthen their outreach efforts.

Our philosophy is to work with our clientele using an integrated perspective to provide research-based, scale-appropriate solutions that complement the University of California's world-renowned achievements benefiting large-scale

agricultural enterprises. We do not focus on implementing the latest technological advances in agriculture, but we do cultivate fresh, real-world solutions for today's small farms. We take pride in continuing the tradition of the founding days of Cooperative Extension in California, as we strive to serve the large numbers of small farms to improve their profitability and by doing so, strengthen their local economies and help their communities thrive.

Shermain D Hardesty

Our program needs to be interdisciplinary and collaborate with others — just like many of the small-scale farmers we work with.



Want to know more about us?

For more information about the funding and accomplishments of the UC Small Farm Program, check out our 2007-2008 Annual Report. The 4-page brief is intended to give an at-a-glance overview of the program's work with specialty crops, efforts to expand outreach statewide, and interdisciplinary approach to agricultural extension work.

The report is available online at www.sfc.ucdavis.edu/docs/annual_2008.pdf.



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The Small Farm Program is a statewide research and outreach program that serves the needs of California's small-scale farmers.

Direct marketing — FROM PAGE 1

both paid employees and the owner's time spent doing these activities. Capital assets include all types of buildings and equipment that were used to complete the activities, such as packing sheds, office buildings, coolers, ice makers, produce washers, packing lines, forklifts, holding bins, labeling machinery, scales, delivery trucks, software and office equipment.

The researchers created table 1 with their extensive list of marketing activities.

"It's easy to overlook some of these activities," Hardesty said. "For example, re-ordering plastic bags for farmers markets or training an employee to sort accurately for wholesale. But these are all costs, and they vary between marketing channels."

There were some common trends in the differences between marketing activities for wholesale, farmers markets, and CSAs. When it comes to activities related to packing and sorting, there was more time and cost involved in preparing for wholesale markets and CSA deliveries than farmers markets. For example, selling to a distributor for wholesale requires specific pack and grade standards, while there are no required packaging standards for farmers markets.

Selling and administration activities also vary across marketing type. For farmers markets, there is considerable effort added by sales staff who work directly with individual customers. CSAs require additional administrative work to maintain multiple small accounts—in comparison to fewer, larger wholesale accounts—and to provide common member services such as newsletters or recipes.

Another important set of considerations in marketing costs is the value of produce that is not paid for. For example, some product intended for wholesale may be sorted out if it does not meet USDA standards, which would mean lower payment to the farmer. However, that same produce could be sold at a farmers market or included in a CSA share. Other scenarios for unpaid product include free boxes for CSA hosts, unsold product at a farmers market, samples and customer bonuses, rounding-down weight at farmers markets, and rejected wholesale deliveries.

In addition to actual costs, it is also important to recognize non-monetary benefits of farmers markets, such as networking and meeting new customers.

Table 1. Marketing-related activities and costs

Activity / Cost	Description
Sorting and packing	
Sort & pack product (facilities & equipment)	Depreciation, utilities, maintenance and other operating costs for facilities used exclusively for each channel's activities, and/or costs of shared facilities. Costs of shared usage are allocated proportionate to sorting/packing labor hours for each channel.
Sort & pack product (labor & materials)	Labor costs include time for all operations after product is brought in from field, including washing, sorting, bagging, bunching, boxing, labeling, storing. Materials costs include boxes, labels, ice, ties, etc.
Load, unload truck (labor)	Includes only time to load truck at farm for delivery route or farmers market, and time to unload truck upon return.
Maintain supplies & equipment (labor)	Labor to clean & maintain sales equipment, including reusable bins, signs, scales, tables, tents, restock selling supplies (plastic bags, etc.) .
Management (labor)	Labor for training & supervision of packing/sorting labor.
Transportation	
Delivery vehicle (capital & operating costs)	Costs to own, maintain and operate delivery vehicles, including fuel, insurance, maintenance & parts, registration and depreciation. Mixed load costs allocated proportionate to product value for each channel in the load.
Delivery (labor)	Labor to drive to and from each channel's sales or delivery sites. For farmers markets, delivery labor includes driver's time for entire farmers market set-up, sales and reloading time, as well as driving time. For mixed loads, actual driving time only is allocated to each channel proportionate to product value for each channel in the load.
Contracted trucking	Transportation charges for contracted trucking.
Tolls	Tolls, allocated proportionate to product value for each channel in the load.
Driver training & delivery management (labor)	Hiring, training, supervision of driver, dealing with delivery problems, arranging routes & loads, negotiating repairs & rentals if needed, etc. Allocated proportionate to delivery labor hours used by each channel.
Selling and administration	
Market communications (labor)	Labor to attend conferences, network, communicate with marketing partners—site hosts, market managers, brokers, distributors, other farmers, advocates and associations.
Wholesale sales (labor)	Labor to discuss orders by phone, negotiate prices & quantities available, create invoices, schedule deliveries, communicate with picking & packing staff about availability and special orders, create pick list, update, change invoices. Compile availability list & distribute as needed to buyers.
Retail sales (labor)	Labor to sell to individual customers, including restaurants picking up pre-orders. Tasks include set up & take down stall, restock product, keep stall clean, offer product samples, etc., donate unsellable product, clean up.
Marketing materials (labor and materials)	Labor and materials used to create, maintain & update web site, ads, brochures, signage, newsletters, display materials, etc. Include consultant fees.
Staff administration (labor)	Administration, training & supervision of sales staff.
Office facilities, equipment, supplies, services use	Cost of office space, equipment, supplies, postage, used exclusively and/or shared. Includes rent or depreciation of office space and equipment, plus utilities, phones, internet, office supplies & services, etc. allocated proportionate to office labor hours used by each channel.
Recordkeeping	Recordkeeping software development or purchase costs.
Account maintenance, banking, bookkeeping (labor)	Labor for on-going maintenance of accounts: receive and process payments, issue invoices, update contact info, etc. Prepare receipts for deposit. Prepare start-up bank for next sales day. Respond to customer inquiries/complaints. Maintain, update record keeping system. Pay bills.
Other office staff (labor)	Labor for personnel administration, payroll, general office maintenance, general communications and updating of certifications.
Business planning (labor)	Determine strategies, prices, policies, equipment needs, sales goals.

Pepper virus survey review and project update from Santa Clara County

California is host to many pepper viruses that continue to create difficulties for growers (see table 1). They seem to go through cycles of high presence, viral infection, and yield losses alternating with cycles of low-level impact.

This year in particular, virus infestation in our pepper growing region seemed to be fairly low, much lower than predicted. But from past experience, we might expect an increase in pepper virus presence in the near future.



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In 2004 and 2005, the central coast pepper production area witnessed a high level of virus presence, and we conducted a field survey of affected fields. The two-year survey assessed the presence and identified the many viruses infecting fields in Santa Clara and San Benito counties.

Survey review

In the surveys, tomato spotted wilt virus (TSWV) and cucumber mosaic virus (CMV) were by far the dominant viruses. In 2004, TSWV was found in 50 percent of the symptomatic samples and CMV in 38 percent. Low-level incidence was recorded for potato Y virus (5 percent), and tobacco etch virus, and pepper mottle virus.

In 2005, similar trends were observed. However, CMV was limited to two locations, while TSWV was found in every location sampled. Of the 50 sub-samples analyzed, TSWV showed up in 52 percent of the cases.

Current field study

This year, we studied the early insect presence in pepper fields, as potential vectors of these viruses. The study was conducted jointly by myself and fellow UC Cooperative Extension farm advisors Steve Koike and Richard Smith, with support from the California Pepper Commission, and cooperation from two growers in Santa Clara County.

The study tracked insect species that are involved in transmitting pepper viruses. We focused on detecting the presence of

Table 1. Viruses affecting pepper plants in California

Virus name	Acronym	Group	Transmission/vector
Alfalfa mosaic virus	AMV	Alfamovirus	Aphid
Cucumber mosaic virus	CMV	Cucumovirus	Aphid
Pepper mild mottle virus	PMMoV	Tobamovirus	Seed, mechanical
Pepper mottle potyvirus	PeMV	Potyvirus	Aphid
Tobacco mosaic virus	TMV	Tobamovirus	Seed, mechanical
Tomato mosaic virus	ToMV	Tobamovirus	Seed, mechanical
Pepper mottle virus	PepMoV	Potyvirus	Aphid
Potato virus Y	PVY	Potyvirus	Aphid
Tobacco Etch virus	TEV	Potyvirus	Aphid
Tomato spotted wilt virus	TSWV	Tospovirus	Thrips
Beet curly top virus	BCTV	Geminivirus	Leafhopper
Beet western yellows	BWYV	Luteovirus	Aphid (persistent)
Potato leafroll virus	PLRV	Luteovirus	Aphid (persistent)

Tospovirus: Tomato spotted wilt virus (TSWV)

For years, TSWV was encountered in the fields in the vicinity of Gilroy, but was a distant secondary problem to CMV in terms of impact on the California pepper industry. Over the last two decades, TSWV presence has been recorded in increasing incidences in the pepper fields in California. In 2004-2005 surveys, over 55 percent of the samples indicated the presence of this virus.

Symptoms: Infected plants with tomato spotted wilt virus are overall yellowing (chlorosis), stunted with dead (necrotic) spots on leaves or terminal shoots.

Fruits show chlorotic spots, red and/or green areas surrounded by yellow halos, concentric rings that may become necrotic.

Transmission: Tomato spotted wilt tospovirus is transmitted by various species of thrips, Western flower thrips (*Franklinella occidentalis*), and Onion thrips (*Thrips tabaci*), and chili thrips (*Scirtothrips dorsalis*). Tomato spotted wilt tospovirus also infects the thrips vector.

It is one of the few plant viruses whose host range includes broadleaf and monocot plants (such as onions).

Host range: Tomato spotted wilt tospovirus has an extremely wide host range among plants, including many crops (celery, Cole crops, lettuce, spinach, tomato, and pepper), ornamental (calendula, gerbera, sunflower, petunia, and nasturtium), and weed plants (chickweed, malva, shepherd's purse, purslane, bindweed and pigweed) including several greenhouse plants.

Virus Management: No completely effective control strategies are currently available in California. No resistant cultivars are available, but sources of resistance have been identified and may be introduced soon. TSWV remains a big problem in greenhouse crops

Virus management requires multipoint strategy that would include (a) regular field scouting, (b) weed suppression, (c) sanitation, (d) isolation of production fields, (e) management of insects, and (f) careful use of pesticides to avoid vector resistance buildup. Breeding for resistance is underway, but resistant plants with desirable horticultural traits are not available yet.

Overall, it will take the cooperative efforts of industry, researchers, and enforcement agencies on a regional scale to coordinate vector management and suppression.

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Pepper fruits infected with tomato spot wilt virus show chlorotic spots with yellow halos. Photos/Images by Aziz Baameur.

Pepper viruses — FROM PAGE 4

insects—mainly thrips and aphids—at planting, post-flowering, and during fruit production periods. We used selected flowering plants to attract and trap thrips that are difficult to detect visually.

The project monitored the pepper fields and tested early treatments' efficacy against

Cucumovirus: Cucumber mosaic virus (CMV)

Symptoms on affected plants vary:

- Plants show an overall lighter color with mosaic patterns (alternating light and dark green areas) especially on the younger leaves.
- Often, the main leaf vein is distorted and somewhat zigzag in appearance.
- Generally, plants show stunting, leaf curling and mosaic, and oak leaf patterns.
- Fruit may be malformed and can exhibit conspicuous concentric rings or spots.

Transmission: CMV is transmitted by more than 60 species of aphids. It can also be transmitted by mechanical inoculation and seed.

- Aphid retains virus for only a short time, minutes to hour, a non-persistent manner

- In general, field spread is related to overall aphid activity, not to the presence of colonizing aphids.

Host range: The host range is extensive and covers several crops (beans, beets, carrots, celery, peas, cucurbits, spinach, tomato and pepper), ornamentals (calendula, periwinkle, and petunia), and weed species (chickweed, mustards, nightshade, and pigweed).

Management: No good sources of resistance in peppers are currently available. Efforts are underway to develop resistant cultivars that also have commercial fruit quality.

these pests.

Though data is not yet available from this year's field study, we intend to provide

growers with information about potential strategies to manage insect populations that may spread pepper viruses.

Farmers working with family — FROM PAGE 1

out around the farm, the state considers these “helpers” to be employees—which means that workers compensation policies are required, as is compliance with other labor-related regulations from various government agencies.

“The biggest challenges for farmers trying to comply with the regulations boil down to confusion and economics,” Molinar said. “It’s hard for them to keep track of everything involved—from single-use towels to disposable cups. And many of them cannot afford insurance and making all of the required modifications.”

To better inform farmers of the regulations they need to follow, Molinar and Yang responded quickly as well. They sought and received a \$47,000 grant from the Western Center for Risk Management Education to assist Southeast Asian and other minority farmers in complying with state labor laws.

In his weekly Hmong-language radio show, Yang discussed the fines as they occurred and explained labor rules to farmers.

Together with Hmong community consultant Toulou Thao, they worked with regulatory agencies to clarify the regulations that Fresno’s small-scale farmers who work with employees need to follow. They gathered posters from various agencies that must appear in an employee workplace, and distributed them to more than 60 farmers. Molinar and Thao worked on a publication that compiles all of the basic requirements of small farm employers into one document. Molinar and Yang presented the information at various meetings over the years—in English, Spanish, Hmong and Lao.

They also helped dozens of Hmong farmers obtain quotes for workers compensation insurance.



Molinar presents at the labor compliance workshop Oct. 2 in Fresno. Photo by Chiengsenseng Cha.

On Oct. 2, the pair organized a labor compliance workshop in Fresno. Approximately 45 farmers attended the event, mostly Hmong, Lao and some ethnic Chinese. Also present at the meeting were representatives from Farm Bureau and from Senator Dave Cogdill’s office.

One of the farmers at several of the meetings on labor regulations was Pang Chang, of Fresno.

“I didn’t know where to go for help,” he said. “But Richard Molinar and Michael Yang helped me with

the labor and OSHA posters and what I need to do to be legal.”

Protecting the ability of farmers to work with family members—in a safe and legal manner—is a goal made easier by the team’s ongoing partnership with the local Hmong farming community.

Thao, the Hmong consultant hired for the project, said that without this working partnership, many more Hmong farmers would have been fined for not knowing or understanding the labor laws.

“(They’ve) gone many extra miles to fill gaps between enforcement agencies and the Hmong farming community,” Thao said.

Research Updates

Strawberry Nitrogen Fertilization from Organic Nutrient Sources

By Mark Gaskell, Mark Bolda, Joji Muramoto and Oleg Daugovich

Editor's Note: The complete version of this paper was presented at the VI International Strawberry Symposium in Huelva, Spain, and will be published in an upcoming edition of *Acta Horticulturae*.

Nitrogen fertilization management is one of the most costly and challenging cultural practices for growing numbers of organic fruit and vegetable producers in California.

The nitrogen fertilization practices for conventional strawberry production practices are also complex and vary markedly whether perennial or annual, and by geographic region, growing period and even cultivar. This variability creates special challenges for organic strawberry growers.

Data from recent strawberry nitrogen fertilization trials—including nitrogen absorption patterns and nitrogen availability from cover crops—are now beginning to answer some of the key questions for organic strawberry producers.

Commercial strawberry production in California is largely based on an annual irrigated production system in which transplants are established each year on newly prepared plastic mulched beds, and the crop typically occupies the land for 7-9 months. A smaller percentage—perhaps 10-15 percent of planted acreage—will be carried over for a second season of production following a severe pruning after a 7-8 month production season.

Overview of strawberry nitrogen nutrition

When transplanted strawberries begin to develop, adequate nitrogen is needed for growth and development that creates the plant structure on which to hang berries of optimum number and size. The nitrogen availability for strawberries at transplanting can be quite variable. Strawberries are watered repeatedly with sprinklers over a 4-6 week period following transplanting and the amount of available nitrogen lost to leaching or early rainfall can be considerable.



Strawberries in California are primarily grown along the Central Coast. Photo by Shermain Hardesty.



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Conventional strawberry production uses combinations of nitrogen sources that assure adequate nitrogen as the plant develops. One common practice with conventional strawberry production is a pre-plant application of a pelleted, controlled-release fertilizer that releases nutrients over a 12-16 week period depending upon moisture and temperature. Those pre-plant nitrogen applications are complemented with in-season weekly or biweekly application of soluble nitrogen as calcium nitrate, beginning a few to several weeks into the season.

These materials are not available for certified organic production and thus a sound strategy needs to be developed to provide adequate nitrogen in organic production systems.

Nitrogen management on organic crops

Organic growers have traditionally depended on compost and prior green manure cover crops as economical sources of early season nitrogen. The nitrogen availability from compost is

generally low and variable however, and a green manure crop may not be suited to specific production rotations, such as that of strawberries.

Strawberries in the intensive annual production system currently practiced in California have specific land preparation, transplant availability, planting, and planting date requirements and limitations that often dictate a planting regime that will not match well with a prior green manure crop. Thus, appreciable mineralized nitrogen could be lost from incorporated compost prior to providing any nitrogen contribution to early strawberry transplant nutrition, as illustrated in figure 1.

There are many new commercial organic fertilizers that combine several organic materials such

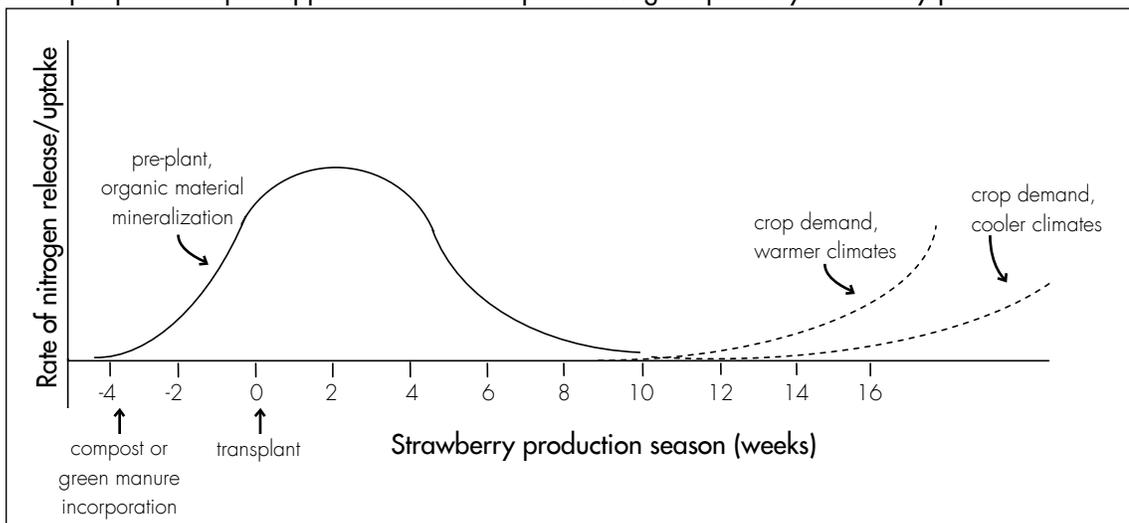
as sea bird or bat guano, soybean (*Glycine max L.*) or corn (*Zea mays L.*) meal, fish or feather residue meal in powdered or pellet form. The pellet form is especially attractive because it has eliminated many of the quality problems of organic fertilizers due to particle size, mixing and settling,

Did you know?

Nitrogen mineralization: Nitrogen is released when microbes decompose various organic materials. Thus, how quickly a material decomposes is very closely related to how quickly it releases nitrogen. The rate at which nitrogen is produced by a decomposing organic material is considered the material's "mineralization rate."

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Figure 1. Visualization of relationship between nitrogen release from pre-plant compost application and anticipated nitrogen uptake by strawberry plants



Crop demand and subsequent nitrogen uptake varies by climate in California's strawberry growing regions. Warmer strawberry districts, such as Oxnard and Ventura, create a slightly more rapid demand for nitrogen in strawberry plants. Cooler climates for strawberries include growing regions around Watsonville. The graphic at left is a depiction of the potential difference in the timing between the nitrogen delivered by pre-plant organic compost and when the nitrogen is needed by the plants.

Nitrogen management

— FROM PAGE 6

and moisture variations. The pellets allow a more uniform application in pre-plant banded form and these organic fertilizers are available in higher nitrogen analysis formulations varying up to 12 percent. The dry organic fertilizers are not useful, however, for the large number of organic strawberry growers that depend upon plastic mulch beds because there is no convenient way to apply these materials.

There are also several liquid organic fertilizer formulations available commercially that allow injection of organic nitrogen through micro-irrigation systems. Growers are increasingly using the finely ground liquid organic materials to provide added in-season nutrition for organic fruit and vegetables production, including strawberries.

Liquid organic fertilizers as a class can be effective sources of in-season nitrogen but there are special problems with these materials that limit their efficient use. These fertilizers are primarily fine suspended organic particles with some soluble nitrogen also. An undetermined amount of this organic material may be filtered out by the micro-irrigation filter systems or trapped behind emitters designed to remove these types of particles. Presumably, mineralization of nitrogen from these materials continues within the filter and irrigation line and the nitrogen eventually arrives at the root zone but

Current field trials

Small Farm Program advisor Mark Gaskell and Tom Lockhart of the Cachuma Resource Conservation District are currently testing nitrogen delivery of three different common organic liquid fertilizers, at three different rates of application. These research trials are being conducted on cooperating farms in Santa Maria.

there is little control over the timing of this application.

Liquid organic fertilizers also have problems with uniformity because they are suspensions of organic particles undergoing microbial transformation and require frequent mixing. Thus, there is a tendency for a higher concentration to settle at the bottom of the storage tank, which increases variability in the uniformity of the material.

These factors collectively contribute to the variability in the amount and timing of nitrogen applied to the crop. And once the organic fertilizer arrives at the root zone, there is additional variability in the mineralization rate, or the speed in which microbes break down and release nitrogen.

California organic strawberry fertilization practices

As with organic production of other crops, the total nitrogen in an organic strawberry system may be adequate or in

excess of crop needs, but the timing of nitrogen availability is limiting. Insufficient early season soluble nitrogen is thought by some growers to be a major factor limiting organic strawberry yields in California, which may vary across growing districts.

Southern district growers as a group inject a much higher percentage of their nitrogen through the irrigation systems than via pre-plant application, which accounts for a narrower range of applied nitrogen. The availability of newer, pelleted, complete-nutrient, higher concentration fertilizers and more economical and uniform liquid organic fertilizers are important improvements in organic nutrient application.

Organic strawberry fertilization research

Annual strawberries behave more as a transplanted annual crop and the timing of nitrogen application should match that growth habit.

New research projects have been initiated recently in California directed at organic strawberry production systems and these should provide valuable information to guide nitrogen use. Projects are underway to evaluate the effects of different liquid organic fertilizer types and various nitrogen rates on soil and plant nitrogen, plant growth and fruit yield, as well as the amount of nitrogen loss in certified organic strawberry production on the central coast of California.

Specialty and Minor Crops Handbook: “Capers”

By Demetrios G. Kontaxis. 1998. Excerpted from “Capers” in *Specialty and Minor Crops Handbook, 2nd ed.* Oakland: University of California ANR. 32-33.

Capers are native to the Mediterranean area and the tropics. The plant, a deciduous dicot, has a very deep root system, grows about two feet tall and has vines 7 to 10 feet long. The flowers are bisexual and have a lifespan of 24 to 36 hours. Each plant produces hundreds of flowers each season. The mature fruit is 2 to 3 inches long and 1/2- to 3/4-inches in diameter. It starts out green, but turns purple when mature. Each fruit contains 200 to 300 seeds.

Propagation and Care. The plant needs little care. It is drought resistant, but requires good drainage. It has few disease or insect problems. Propagation is best accomplished from roots or cuttings because of the variability found in seed propagated plants. Root the cuttings in a greenhouse for at least one year, and then plant in the field on an 8- by 8-foot grid during February or March. In the first two summers, new plants require two to three irrigations. Older plants need less irrigation except in dry years and very hot summers. Spring fertilization is advisable, with irrigation after each application.

Seedlings are very temperamental when transplanted, and some may die. To reduce this loss, transplant with soil attached to the root system, and water immediately after transplanting.

Let seedlings grow to 3 to 5 inches tall before transplanting. If seedlings are too crowded in the clay pot or flat, do not pull them—use scissors and cut off the small, less vigorous, plants, leaving the root systems of the remaining seedlings undisturbed.

Transplant the seedlings to individual 1-gallon containers, using the same planting mix as mentioned before. When transplanting, disturb the root system as little as possible, keeping some original soil around each transplanted seedling. Good soil drainage is essential to prevent root rot. Pack the soil tightly around the transplanted seedling and water immediately. Cover each container with a plastic bag. Keep in a shaded spot in spring or summer, or in a warm area (70-85 F) in winter. Keep the plastic bag in place for one week. At the end of the week, cut off the top of the bag so that the seedling will be exposed gradually to the natural environment. In another 10 days, enlarge the opening in the plastic bag. One week later, remove the plastic bag entirely, keeping the plant in a shaded area. Keep the plants in their 1-gallon containers and then transplant them in early spring after the last frost, when soil is workable.

Plant the capers in elevated rows. The rows should be 8 to 10 feet apart, and the plants in each row should be 8 to 10 feet apart within the row. Water frequently, but make sure that drainage is adequate, and fertilize two to three times during the spring



An unharvested caper bud flowers. Photo by Richard Molinar.

Editor’s Note: SFP Advisor Richard Molinar maintains a test plot of caper plants at UC Kearney Agricultural Center. Recent news articles have highlighted his work with capers as a niche crop for small-scale farmers.

Capers field update

Propagating: Our success in buying and germinating seeds has been poor. Either they are too old or have a poor germination percent. A better method for the seeds is putting the just harvested pods and seeds (spread out) in soil immediately after harvest. This had better results, approaching 75 percent germination.

If propagating by cuttings, we prefer to make cuttings in the spring from desirable plants and root them with bottom heat and with top misting. The cuttings are from the new growth and have 2-3 nodes. They are dipped in a rooting hormone (Indole Butyric Acid). With this procedure it takes about 4-6 weeks for the cuttings to root.



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Harvest: This is a very labor intensive crop. It takes 30-45 minutes to harvest the buds from one plant. Having the plants elevated would facilitate the harvest immensely. In 2003, we harvested from one 6-year-old plant once a week. We missed some buds that opened into flowers, so a better frequency would be to harvest every 3-4 days. The buds began to develop in early May, and continued until Oct. 9. Our yield for the year was 2,143 grams (4.7 lbs.) from the one plant.

We have both spineless and spined varieties. There are definitely differences in flavors between the two types and not being connoisseurs, we are not sure which one is the preferred or better. The spined do appear to be somewhat more vigorous and productive, but there is a difference of about two years between the plantings. We can say with assuredness that the spineless are much easier to harvest without having to worry about getting stabbed by the spines.

Pests: The only pest problem we have ever had (7 out of 9 years) was the false chinch bug (*Nysius raphanus*). They tend to swarm onto the plants in spring, sucking plant juices and result in some wilting of the new growth. They are easily controlled with synthetic or organic pesticides. We sprayed twice with Trilogy five days apart and were happy with the results.

and summer months. Irrigation is essential for the first two years of development. Do not prune the young plant for the first two years. Prune 3-year-old or older plants to the ground (soil surface) during November or December. Cut the canes back, but only 3 or 4 inches from the crown—cutting the canes all the way to the crown may kill young plants.

Field days in photos: Blueberry, mini watermelon and pitahaya events



Miniature Watermelon Field Day photos: Left, Michael Yang prepares samples for participants. Above, more than 33 varieties of miniature watermelon were ripe for tasting, including a yellow-fleshed variety. Right, Richard Molinar explains the growing methods used for miniature melons. The melon variety trials are in a field transitioning to organic status.



Blueberry Field Day photos: At left, Manuel Jimenez discusses the blueberry field trials at UC Kearney Agricultural Center. Below, participants were invited to taste test several dozen varieties.



Pitahaya Field Day photos: Far left, Ramiro Lobo shows damage to pitahaya on the vine by pests. Near left, Lobo and Edgar Valdivia show participants a wire support system for growing pitahaya at UC South Coast Research Center in Irvine.

Both photos courtesy Guenter Schott, San Marcos, CA.

program news

Upcoming Event: Organic Soil Fertility Management Symposium will be held Jan. 15, 2009 at UC Davis. The event combines the latest technical information on nutrient dynamics in organically-managed soils with practical results of on-farm nutrient management research. SFP advisor **Mark Gaskell** will present at the symposium, along with other UCCE and UC Davis academics. For more information, visit <http://ucanr.org/vric/organic-soil-event>.

Nitrogen management tools and organic fertilization, especially when it comes to strawberry production, were topics addressed by SFP advisor **Mark Gaskell** at multiple water quality-related meetings in November, including the Nov. 6 Water Quality Symposium in Santa Maria, Nov. 13 Fresh Approaches to Fertilizing Techniques conference in Modesto, and Nov. 19 at the Western Plant Health Association's Nutrient conference in San Luis Obispo.

Producing blackberries for market windows was the topic of a presentation by SFP advisor **Mark Gaskell** Nov. 5 at a Caneberry Production Meeting in Ventura County.

Guava orchards were the subject of a new cost study examining the costs of guava establishment and production in San Diego County. SFP advisor **Ramiro Lobo** was one of the study's co-authors. Other new cost studies examine alfalfa hay, pistachios, corn for silage, grain corn, beans and mandarins. These and other cost studies can be found at <http://coststudies.ucdavis.edu>.

Small Farm Progress Days on Oct. 8 in Placer County included a display and handouts from the UC Small Farm Program. The event focused on small-scale livestock production and new farming equipment, both horse-drawn and conventional.

A workshop on labor compliance was held Oct. 2 in Fresno. More than 45 small-scale Southeast Asian farmers attended the event, organized by SFP advisor **Richard Molinar** and assistant **Michael Yang**.

Defining urban agriculture and related opportunities for Master Gardeners was the topic of SFP Program Representative **Kristin Reynolds** at the Sept. 24-26 California Master Gardener Conference in Pacific Grove.

Pitahaya Field Day was held Sept. 13 at the UC South Coast Research and Extension Center in Irvine. Approximately 120 people attended the event, organized by SFP advisor **Ramiro Lobo**. The day included a tour of field plots, demonstrations, a panel discussion and variety tasting. For more, see photos on p. 9.

Visitors from Argentina toured several small-scale farms of Fresno under the guidance of SFP advisor **Richard Molinar** in September.

Small-scale farmers supplying university food services including the potential opportunities and barriers, was the topic of a discussion by SFP director **Shermain Hardesty** at the UC/CSU/CCC Sustainability Conference Aug. 1 in San Luis Obispo.

Miniature Watermelon Field Day was organized by SFP advisor **Richard Molinar** and assistant **Michael Yang** for July 31 at Kearney Agricultural Center. For more, see photos on p. 9.

Fertigation was the topic of a hands-on workshop for irrigators and growers, July 30 in Hollister. SFP advisor **Aziz Baameur** helped organize the annual meeting, which addressed topics related to irrigation systems, fertilizer injection and injection system calibration.

UC Small Farm Workgroup members held their annual meeting June 11-12 at UC Davis. Presentation topics included recent research as well as collaboration opportunities, budget updates, and staffing needs. A technology workshop was also offered to participants. Select presentations from the workgroup meeting are available online at www.sfc.ucdavis.edu/events/08workgroup.html.

2008 Week of Blueberries combined four blueberry-themed workshops and field days in various California locations, organized by farm advisor Ben Faber, SFP advisor **Manuel Jimenez** and SFP advisor **Mark Gaskell**. See photos from the field day held at Kearney Agricultural Center on p. 9. Presentations, a short video and other links from the 2008 Week of Blueberries are available online at www.sfc.ucdavis.edu/events/08blueberries.html.

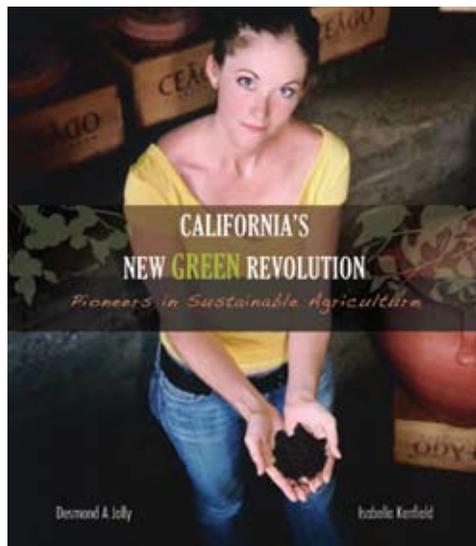


Retirement: Birgit Hempel retired on June 27, after 14 years as the administrative assistant for the Small Farm Center at UC Davis. Hempel has long been the matter-of-fact voice heard first by clients calling for assistance. Besides acting as librarian for the center's online library of agricultural articles, she's taken pride in seeking answers for clients with all manner of questions. She was also integral in cataloging CalAgTour.org, the statewide agritourism database.

New book profiles innovative farmers

Copies are now available of the recently published book *California's New Green Revolution: Pioneers in Sustainable Agriculture*.

The new book is a collection of profiles of innovative family farmers and agricultural marketing organizations, with a focus on the sustainable agriculture movement.



Farms included range from single-person operations to community supported agriculture (CSA) programs that feed thousands of members. The farms explore new methods of production, marketing, and employee relations. Stories include a vineyard producing biodynamic wine, a small-scale grain CSA, a farm operated jointly by multiple families, and a distributor of organic produce.

Co-authors of the book are Desmond Jolly, former director of the Small Farm Program, and Isabella Kenfield, a former staff member. *California's New Green Revolution* is 196 full-color pages, and costs \$9.36 plus tax, shipping and handling.

An order form and more information are available online at ucanr.org/green_revolution.

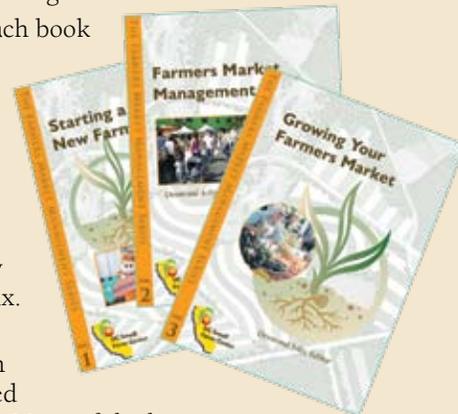
Any additional questions can be directed to the Small Farm Center, sfcenter@ucdavis.edu or (530) 752-8136.

Farmers market resources now online

Several popular publications for managers and vendors of farmers markets are now available as free downloads from the UC Small Farm Program.

Print copies of each book are still available from the Small Farm Center, though some of the titles are in limited supply. Orders for printed copies are taken by e-mail, phone or fax.

The five newly available books can each be downloaded as individual PDFs. Many of the longer books are also available in a chapter-by-chapter format, for faster downloads.



The titles now available to read online include:

- *Starting a New Farmers Market*
- *Management Skills for Market Managers*
- *Growing Your Farmers Market*
- *Food Safety at Farmers Markets and Agritourism Venues*
- *Guide to Managing Risks and Liability at California Certified Farmers Markets*

The UC Small Farm Program was an early proponent of farmers markets and the profession of farmers market managers. For descriptions of each book and current farmers market resources, visit our Farmers Markets web page at www.sfc.ucdavis.edu/farmers_market.



PEDRO ILIC AGRICULTURE AWARD

Nominations are now open for the 2009 Pedro Ilic Awards, given each year to an outstanding farmer and to an outstanding educator.

Nominations are online at ucanr.org/ilic-award. The deadline is Jan. 12, 2009.

Winners of the 2009 Pedro Ilic Awards will be honored at the California Small Farm Conference, March 1-3 in Sacramento. Honorees will also receive a scholarship to the conference.

The Pedro Ilic awards are named for the Fresno County small-scale farm advisor whose untimely death in 1994 prompted the decision to annually honor those who carry out his legacy of personal commitment to small-scale and family farming. The awards were established in recognition and memory of Ilic's dedication and innovation.

A successful nominee:

- envisions what can be done and has the imagination, energy, and intellect to translate that vision into a successful activity;
- is part of the solution, not of the problem; critical in thinking, but constructive in approach;
- is an advocate and risk taker;
- is an effective teacher, instills self-esteem in others and constantly encourages others;
- is a dedicated professional who believes in his/her work;
- has determination, exuberance, high energy, and genuine friendliness for all people, with the conviction that the smallest is as important as the biggest; and
- has high personal and family values.

For more information, visit www.sfc.ucdavis.edu/awards

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Join us at the annual statewide conference for small-scale farmers



Staff and advisors of the UC Small Farm Program will share their expertise with hundreds of farmers, ranchers, farmers market managers, and students at the 22nd convening of the California Small Farm Conference, March 1-3 in Sacramento.

Themes for this year's workshops include production strategies, marketing techniques, agricultural hot topics, resource conservation and farmers market innovations.

As a major organizing sponsor, this year the UC Small Farm Program is organizing short courses and tours on "Cherry Production and Marketing: Avoiding the pits, reaping juicy rewards" and "Farming In and Around Cities."

UC Small Farm Workgroup academics will also be organizing and speaking at workshops on small-scale livestock, urban agriculture, equipment for small farms and regional marketing programs.

See you in Sacramento!