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From the Director

New Funds, Statewide Visits On Deck

During the changing of the guard (searching for a permanent SAREP director), I'll be holding the reins of this exciting organization. Some new things are in the offing, as AB 1998 has survived the political process (See "New BIFS/Methyl Bromide Allocations,") It provides $1 million as a supplement to our Biologically Integrated Farming Systems (BIFS) program and $1 million for research, outreach and demonstration for alternatives to methyl bromide. With these new funds, we can begin to expand our program with greater vigor.

The search for the new director is progressing. Interviews of the four candidates should be completed by the time this newsletter is printed. If one of the candidates is successful, and depending on his/her commitments, we expect that person will be on board around the first of the year.

I'm planning to visit certain University of California campuses, UC field stations, California State University campuses and county extension offices over the next couple of months to assess how administrators, faculty and staff view SAREP's activities. We want to ensure that people know who we are, what we do, and to explore how we can cooperate on specific programs. Meetings with farmers and commodity groups will also be initiated.

It is exciting to be a part of this organization, and I look forward to assisting the staff during my tenure.---- *Bob Reginato, interim director, University of California Sustainable Agriculture Research and Education Program*.

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PCA Education Focus of New Project

UC SAREP education coordinator **David Chaney** and **Ann Mayse**, SAREP professional development assistant, have received a grant of $80,000 from the USDA's Western Region Sustainable Agriculture Research and Education (SARE) program to develop several new educational opportunities for pest control advisors (PCAs) in California and Oregon. The goal of the two-year project is to provide PCAs and other agricultural professionals with current research-based information on the practical application of sustainable agriculture to use with their clientele.

There are more than 4,000 licensed pest control advisors in California employed by farmers and ranchers to help with critical crop management decisions. They are in a unique position to promote more efficient use of farm resources and practices that enhance natural biological cycles and controls. Mayse and Chaney will be coordinating the development of two Internet-based courses on agroecosystem management, and will also be collaborating with university and other technical experts to produce a series of audio cassettes covering specific crop-pest interactions and management issues, as well as the more general aspects of biologically intensive pest management, soil quality, and sustainable agriculture.

As part of this project Mayse and Chaney will also be working closely with experts at the Integrated Plant Protection Center at Oregon State University to provide information on ecological pest management to PCAs in Oregon through a facsimile service and an electronic mail listserve. There are about 1,000 licensed pest control consultants in Oregon.

Other members of the project team include **Mark Mayse** and **Phyllis Kuehn** from California State University Fresno, Pete Goodell, UC Cooperative Extension regional IPM advisor, private consultant **Larry Whitted**, the Association of Applied Insect Ecologists, and the A*DEC Distance Education Consortium. Funding and initiation of project work is subject to final approval of the SARE program's FY98 budget, which is expected in the fall. For more information about the project contact Mayse at (209) 278-0284, Email: amayse@csufresno.edu.

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BIFS Awards: Growers, UC Scientists, Consultants Team Up to Reduce Ag Chemicals

Three groups of farmers, researchers and ag consultants in counties stretching from Tehama in the north to Kern in the south have been awarded almost $200,000 to demonstrate biologically integrated farming systems (BIFS).

A rice team will be awarded $100,000, a walnut team will receive $53,720, and a prune team will receive $45,000 for the first year of their three-year projects. Each will use a farmer-to-farmer approach for information and technology exchange, emphasize science-based information, and will monitor key biological and economic variables.

Funding for this round of BIFS projects came from the U.S. Environmental Protection Agency and the University of California Division of Agriculture and Natural Resources. The program is administered by UC SAREP. Original authorization for the program came from the 1994 California Assembly Bill 3383 with start-up funds from US-EPA and the state's Department of Pesticide Regulation, which funded projects in winegrapes and vegetable crops.

"We're delighted to award these grants to three voluntary researcher-farmer groups who have come together to address the long-term sustainability of California agriculture," said **Jenny Broome**, SAREP BIFS coordinator. "Similar projects have shown that using a team approach coupling innovative farmers with scientists is a very effective way of helping other growers adopt biologically integrated farming practices."

Farmers involved in the BIFS projects are integrating biological and cultural control of pests into their production systems; providing on-farm habitats for beneficial insects, mites and spiders; and emphasizing soil-building practices such as using cover crops to provide all or part of the nitrogen needed by crops. The intended result, according to Broome, is that biologically integrated farming systems will enable farmers to maintain yields and quality while greatly reducing their reliance on agrichemicals.

BIFS teams include farmers, pest control consultants, and University of California farm advisors and researchers. All three of the newest BIFS projects will be using successful working farms to demonstrate agricultural operations that have reduced pesticide use in high-value crops. Other area farmers have agreed to participate by adapting the methods demonstrated to sections of their own farms and then monitoring and comparing results with their normal practices.

"BIFS-style projects involve a high level of cooperation among individuals, public institutions and private companies," said **Robert Reginato**, SAREP

interim director. "Projects involving such diverse groups are a challenge to plan and run, but we do have a better road map now than was the case three years ago. We are moving ahead to help new teams get started with BIFS, building on the experiences of the earlier projects, while retaining flexibility to respond to local conditions."

Rice Project

Priorities in the rice project are summer water depth management, winter flooding, and drill seeding according to **Randall Mutters**, Butte County farm advisor and member of the rice management team. Mutters is collaborating with UC Davis faculty and extension researchers, an agronomist/pest control advisor for the Butte County Rice Growers Association, and seven rice farmers, including **Herbert Pierce** of Chico and **Bryce Lundberg** of Richvale.

Farmers are eager to try new methods, Mutters said, for several reasons: increased weed resistance and more regulations have increased chemical costs, there is a need and a desire to improve water quality, and in 2003 the federal farm subsidy program will end and profit margins will shrink.

"We have gotten a resounding vote of confidence and encouragement from the growers who will be participating in the program. They realize the need to revisit some of the conventional cropping systems practices in order to minimize inputs and maintain profitability and long-term productivity," he said. "That kind of grower encouragement generates a lot of enthusiasm within the research community because the bottom line at Cooperative Extension has historically been to address problems of an applied nature with immediate benefits to the agricultural community. The exciting part of this program is that it addresses both the immediate and long-term issues of sustainability."

Drill seeding is one of the cropping practices that growers are experimenting with, Mutters said. He noted that the usual practice for planting rice is to flood the fields and seed them by airplane. An alternative practice is to drill seed the rice and carefully control the water level to kill weeds but nourish the rice seedlings. "Moving water onto the fields at different depths at the right time is very important with some alternative weed control methods," he said.

William Horwath, assistant professor in the UC Davis land, air and water resources department and a member of the BIFS rice management team, noted that Òthe BIFS project also gives us the opportunity to continue building bridges with other disciplines, such as wildlife interests.Ó He said winter flooding and residue incorporation in rice paddies has shown an increase in soil nitrogen availability and at the same time provided expanded habitat for waterfowl.

Prune Project

Gary Obenauf, coordinator of the prune BIFS project, is project manager for the California Prune Board and has been involved for several years with the Biological Prune Systems (BPS) program in the Upper Sacramento Valley. The BIFS prune project will incorporate biologically integrated farming

methods that the BPS and a similar Environmentally Sound Prune Systems (ESPS) program has been promoting since 1996. Demonstration orchards will be established in each prune growing area including Butte, Colusa, Glenn, Merced, Sutter, Tehama and Tulare counties. Each orchard will be split, comparing the conventionally managed and biologically-based production systems. All plots will be monitored weekly by field scouts using proven monitoring methods.

"The BIFS prune project will bring more cooperation between the University of California and the Biological Prune Systems program," he said. Obenauf noted that the BIFS project will be combined with other support from several different programs all with the same reduced pesticide thrust. The California Prune Board will be providing more than $250,000 in support of the combined efforts.

One of the prune orchards used as a demonstration site for the BIFS project is located at Abbey Ranch in Vina, Tehama County. Monks at Abbey's monastery are participating in the BPS and ESPS projects, and have hosted demonstrations in cover crop plantings and pruning techniques at their site, according to **Fred Thomas** of CERUS Consulting, a participant in the management teams of both the prune and walnut BIFS projects. Other BIFS prune demonstration orchards will include the farms of **John Heier** of Live Oak, **Brad** and **Monte Johnson** of Gridley, and Onstott Orchards of Gridley.

"These growers who are doing a lot of the BIFS work are taking risks with their orchards and their own bottom lines for their commodity and industry," said Thomas.

Walnut Project

Joe Grant, San Joaquin County farm advisor and coordinator of the walnut BIFS project, said their focus will be on adapting concepts and practices from similarly constructed Biologically Integrated Orchard System (BIOS) projects in Yolo and Solano counties to the San Joaquin Valley, where more acres of walnuts are grown and where the pressure from codling moth is greater.

"Codling moth is a very serious pest here," Grant said. "The blueprint for codling moth management in this project will be to use a less disruptive pesticide in combination with pheromone mating disruption and biological control with *Trichogramma* wasps, which have really only been tried in isolation before. If we can make the combination work against codling moth here, we think it will work anywhere."

Grant said another unique aspect of the walnut project is the formal collaboration between UC and the Community Alliance with Family Farmers (CAFF), a non-profit organization that was instrumental in starting the BIOS projects and in securing state funding for the BIFS projects.

"UC will coordinate orchard monitoring, management team activities, and other implementation aspects of the project," Grant said, "but CAFF will do the outreach components which they do so well, including producing a newsletter for the growers and organizing field days."

Grant said he is eager to work with the farmers enrolled in the walnut BIFS

project. "The neat thing about our group of growers is that they cover the whole range---from small, limited-scale, part-time growers, to larger, more mainstream growers on big acreage," he said. Walnut demonstration orchards will be located at the farms of **Garth Joliff** of Modesto, **Christopher Locke** of Lockeford, **Tom McGurk** of Stockton, **Jack** and **Diana Radavero** of Linden, and eight other sites.

Grower **Russell Lester**, of Dixon Ridge Farms in Winters, said he hopes to be a link between the existing BIOS walnut project in Yolo and Solano counties and the new BIFS walnut project in the San Joaquin Valley. "We've learned a lot with the growers here about what works and what doesn't, and hopefully the San Joaquin Valley growers can start in a more advanced position. Having worked with BIOS projects over the last five years, it's very exciting for me to see the information
extended into that very important walnut growing region of the state."

The three BIFS pilot projects are funded for one year. Contingent upon demonstrated progress, the projects will be eligible for renewed funding. The additional money recently provided by the California Legislature (see "New BIFS/Methyl Bromide Allocations," p. 2) will allow SAREP to fund more new projects as well as extend the funding of current projects.

New BIFS/Methyl Bromide Allocations

UC SAREP will receive two $1 million allocations from California's 1998-99 state budget to continue the highly regarded Biologically Integrated Farming Systems (BIFS) projects, and to begin research efforts for alternatives to methyl bromide.

One million dollars is designated for BIFS demonstration projects which involve teams of farmers, researchers, and ag consultants who develop strategies for weed and pest control, including the use of beneficial insects and cover crops as a means to reduce agricultural chemical use. The other $1 million will be used to develop alternatives to methyl bromide, a common agricultural fumigation tool.

"We are very pleased to be involved in these two endeavors," says Robert Reginato, SAREP interim director. "Since regulations for pesticide use are becoming increasingly restrictive, it is important for us to help farmers find other methods to combat pests and stay financially sound."

Reginato notes that previous multi-year BIFS projects administered by SAREP have been well received by the agricultural community. The first BIFS allocation in 1994 funded projects in winegrapes and vegetable crops (see "SAREP Awards BIFS Grants to San Joaquin Valley Growers, Scientists," *Sustainable Agriculture* Vol. 7, No. 4, Fall 1995); funds provided by federal EPA will support extension efforts in prune, walnuts and rice (see "Growers, UC Scientists, Consultants Team Up to Reduce Ag Chemicals," this issue).

The $1 million appropriation for BIFS supports legislation authored by Assemblymember **Helen Thomson**, D-Davis. The bill, AB 1998, received overwhelming support in both houses of the State Legislature and was signed by the Governor. It extends the existing BIFS program, articulates additional goals of BIFS projects and adds language allowing SAREP to use a portion of BIFS funding to support research related to biologically integrated farming systems. AB 1998 was sponsored by the Davis-based Community Alliance with Family Farmers. Both the California Farm Bureau Federation and the University of California supported the bill.

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Project Update

On Shaky Ground: Farm Operator Turnover in California Agriculture

by Don Villarejo, California Institute for Rural Studies

In early August 1998 the California Department of Food and Agriculture announced that 1997 was yet another record-breaking year for the state's farm production. Paced by a remarkable combination of the highest harvested tonnage and prices for wine grapes ever recorded, California farmers received an estimated total of $26.8 billion from commodity sales. That amount is greater than the combined output of the next two highest ranked states: Texas and Iowa. California farmers have achieved four successive production record years.

But behind the announcement lies a little known fact documented in the California Institute for Rural Studies (CIRS) report On Shaky Ground: Farm Operator Turnover in California Agriculture. Sponsored and funded by SAREP and the Community Alliance with Family Farmers, the report finds business turnover among operators of California farms is quite high. Whether it is the difficulty experienced by older farmers facing retirement in finding a young family member to take over the operation, or the continuing financial stress that many small- and medium-scale farmers experience, a great many farm operators leave the business each year. At the same time, as demonstrated in the report, in nearly every case a new operator comes in and is willing to try their hand.

Most studies of farm sustainability today focus on production practices, especially issues pertaining to reliance on synthetic chemical pesticides and fertilizers. However, sustainability also refers to business longevity. If farmers are unable to earn a living, then no amount of environmental consciousness will be able to keep them in production.

The report documents the experience of crop, dairy and nursery farm operations in Fresno and Monterey counties in California over five consecutive years, 1990-94. Detailed records of farm operators were compiled, representing more than 7,300 individual farms in Fresno County and 1,200 in Monterey County.

The main findings were that the five-year rate of farm operator turnover in Fresno County was 38.5 percent and it was 54 percent in Monterey County. That is, of 5,512 Fresno County farm operators active in 1990, 2,269 had left farming by 1994, but 1,792 new ones had started up. Similarly, of 810 Monterey County farm operators active in 1990, 444 had discontinued and 414 had entered the business by 1994.

These are very high rates of farm operator turnover, suggesting that even in a relatively prosperous period for agriculture, economic pressures have been

substantial. The study also found that economic factors may be at the heart of the matter: the larger the farm the lower was the likelihood of leaving the business. For the smallest Fresno County farms, the rate of attrition was more than two and one-half times larger than for the largest size farms.

The report recommends that: culturally appropriate outreach and support for new farmers be strengthened, lenders be prohibited from discriminating against new or small farmers, and land use strategies or environmental policies that disadvantage small farmers be re-examined from the perspective of mitigation of adverse impacts.

Copies of the 42-page, $10 report are available from CIRS at (530) 756-6555, ext. 13. An executive summary of the report is available on the CIRS Web site at http://www.cirsinc.org

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Plunging Beef Prices Make 'Natural Beef' Attractive

A new publication detailing the marketability of regional grass-fed "natural beef" could help ranchers consider their options during a severely depressed beef market, reports a University of California farm advisor. Natural Beef: Consumer Acceptability, Market Development and Economics, a free 84-page publication is the outgrowth of a 1996 project funded by SAREP.

"We started this publication when beef prices were very low and I thought it'd be another ten years before it would be so timely," says Glenn Nader, livestock and natural resources advisor for Yuba, Sutter and Butte counties. "But guess what---here we are back at the same depressed-price place." Nader says beef prices are currently (summer 1998) less than 60 cents per pound, compared to a normal price of about 70 cents per pound.

Nader says beef producers are once again faced with the question "What do you do with an 800 pound steer?" "Ranchers are telling me that they can't sell the beef at the price their bankers says they need to break even," he says.

Research indicates that grass-fed beef could be an additional market niche for cattle ranchers faced with low prices. "Preliminary work shows that this could be a way to diversify ranchers' income stream, but they must be very careful," Nader said.

The publication grew out of work done by a team of ranchers, CSU Chico researchers, UC Cooperative Extension personnel and students who found strong consumer and restaurant interest in a grass-fed, lower-fat product. Researchers developed a sample marketing plan to provide strategies for potential product development in Northern California, and four case studies are included in the publication to show ranchers what to expect if they pursue this market.

Researchers found that transportation was the most sensitive issue for grass-fed beef operations. Costs are greatly reduced if grass-fattening operations are located near a processing plant and the target markets, Nader said. Other factors that are critical for natural beef ranchers are advertising costs, product liability insurance needed to sell at farmers' markets, inventory management, labor laws, county environmental health requirements, and packing.

For copies of the free publication, contact SAREP at (530) 752-7556; sarep@ucdavis.edu A World Wide Web version of the document is available at http://www.sarep.ucdavis.edu/grants/reports/nader/

Grass-fed cattle are an option for ranchers looking for alternatives to grain-fed stock as beef prices drop.

UCSC Farm Apprenticeship

The Center for Agroecology at UC Santa Cruz offers a six-month training course in organic gardening and farming, "Apprenticeship in Ecological Horticulture," from mid-April to mid-October 1999. It emphasizes hands-on learning, working side-by-side with instructors, and classes in organic horticultural methods. Cultural requirements for vegetable, herb, flower and fruit cultivars are covered, including the specifics of soil preparation, composting, sowing, cultivation, propagation, irrigation, and pest and disease control. Marketing efforts include an on-site Community Supported Agriculture (CSA) project. This is a full-time program involving strenuous field and garden work five days a week. Most apprentices choose to live on the Farm in their own tents. Several full and partial tuition waivers are available. Tuition for the 1999 program is $3,000 with additional costs for books, tools, and food.

Application deadline is November 2, 1998 for domestic and Canadian participants. For an informational brochure and application contact: The Center for Agroecology, UC Santa Cruz, 1156 High Street, Santa Cruz, CA 95064;
Tel: (408) 459-2321; Fax: (408) 459-2799; Web site: http://zzyx.ucsc.edu/casfs

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Project Seeks 1,000 Sustainable Farmers, Ranchers

Know any good sustainable farmers or ranchers? If so, "1,000 Ways to Sustain U.S. Agriculture," a pilot project funded by the USDA's Sustainable Agriculture Research and Education (SARE) Program, wants to hear from you.

SARE and project partners hope to paint a clearer picture of sustainable agriculture by profiling successful farmers and ranchers. While the case studies will describe production and marketing practices, they also will detail how these practices improve profitability, the environment, rural communities, and the families' quality of life.

"Sustainable agriculture defies simple definition," says. **John Ikerd**, an agricultural economist at the University of Missouri-Columbia and coordinator of the "1,000 Ways" project. "The best way to communicate the meaning of sustainable agriculture is through real-life stories of people who are developing these systems in their own fields."

"To be sustainable, these operations must be profitable," adds Ikerd, who is also coordinator of the Sustainable Agricultural Systems Program at the University of Missouri. "But these producers aren't maximizing profits at the expense of family, community, and the environment."

Craig Cramer, former editor of *The New Farm* magazine and author of the *Sustainable Farming Connection* web site, will research and write the profiles. By gathering information directly from practitioners, he believes the case studies will reflect a true from-the-fields perspective.

To recommend a farmer or rancher for the case studies or for more information about the project, contact Cramer at (607) 753-8925 or cdcramer@clarityconnect.com), or visit the project's web site http://1000ways.baka.com.

"Our goal is to take sustainable agriculture out of the abstract and show a thousand different ways that it works in reality," says Ikerd. "When you have that many examples, it's hard not to find at least a few strategies that will work on your own operation."

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BIFS Rice Project Coordinator Sought

A search is on for the coordinator of the newly established Biological Integrated Farming Systems (BIFS) project on rice in the Sacramento Valley. The mandate of this newly established BIFS project in rice cropping systems is to reduce pesticide input without jeopardizing productivity by using alternative rice management practices. The projected duration of the project is three years. Although the project is strongly oriented toward outreach and extension, research is an integral component. The coordinator will act as liaison between farmers and members of the University of California and the California rice industry. The position requires a Ph.D. or a master of science degree with extensive experience in one or more of the following areas: crops, soil, weed science, pathology, entomology or a related field. Experience in rice cropping systems is highly desirable. Strong interpersonal skills are needed, as is the ability to communicate effectively with farmers and researchers using a variety of communications tools, including writing and updating a web page. It will be important for the coordinator to implement research projects that support the overall goal of the BIFS mandate, and interpret and report results to producer clientele and the scientific community. The work location is primarily Butte County. Salary range is $30,000 to $35,000 annually, commensurate with experience. Closing date for applicants is **November 15, 1998**. To apply, please submit a letter of application, resume, and names and contact numbers of three references to Dr. R. G. Mutters, University of California, Cooperative Extension, 2279 Del Oro Avenue, Suite B, Oroville, CA. 95965; Tel: (530) 538-7200; Email: rgmutters@ucdavis.edu

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Henry A. Wallace Institute for Alternative Agriculture

The Board of Directors of the Henry A. Wallace Institute for Alternative Agriculture seeks to fill the position of executive director. Candidates must have a demonstrated record of experience in sustainable agriculture and food systems and a commitment to the successful implementation of the vision and mission of the Wallace Institute http://www.hawiaa.org. The deadline for applicants is **January 1, 1999** or until the position is filled. Contact the Institute for the complete announcement at: Search Committee for Executive Director, Henry A. Wallace Institute for Alternative Agriculture, 9200 Edmonston Rd. Suite 117, Greenbelt, MD 20770-1551; Tel: (301) 441-8777; Fax: (301) 220-0164; Email: hawiaa@access.digex.net

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Technical Review

Use of Weather Data and Disease Risk Assessment Models for Integrated Disease Management in California - Botrytis cinerea on Grapes and Strawberries

J.C. Broome, W.D. Gubler, A.C. Bordas and J.F. Strand

Presentation at the 7th International Congress of Plant Pathology, August 9-16, 1998, Edinburgh, Scotland

Over the past 15 years numerous models have been developed that quantify the influence of the environment and biological factors on disease. By 1997, several public and private weather station networks had been established with over 500 stations throughout California. These on-site weather stations monitor microclimate variables such as air temperature, relative humidity, hours of free moisture, and precipitation. The networks provide the infrastructure needed to collect appropriate weather data, facilitate research and validation of disease models, demonstrate use of models in disease management, and further region-specific implementation efforts. Weather data and disease risk indices are gathered, controlled for quality, made available for users, and archived. A disease model database has been created as part of the University of California's public weather station and disease forecasting network. This database contains descriptions of the available models, author(s), appropriate publications, algorithms, action thresholds and related disease management information, and model validation work performed in California. Botrytis bunch rot of grapes (*Botrytis cinerea*) is one disease that is described in the database. Broome et al (1995) developed a multiple regression model for predicting infection periods of grapes based on the interaction of the hours of free moisture and temperature. This model was validated on table grapes in Chile and is currently used extensively to time fungicide applications.

Results and conclusions

By the end of 1998, the disease model database will contain at least 41 different models of 13 important fruit and nut diseases, and 23 different models of 11 important vegetable and turf diseases. Currently, 20 disease risk models are being either developed, validated or implemented in California by different researchers. In California, between 1995 and 1997, the grape Botrytis model was evaluated for use on strawberries in Watsonville (Bordas, 1997). The risk index action threshold used on grapes was reduced for use on strawberries. Applications of iprodione were made according to the model versus a grower's standard program and resulted in two versus four

applications in 1995, four versus ten applications in 1996, and eight versus nine applications in 1997. Yields of marketable fruit were not statistically different in 1995, 1996 or 1997 between strawberries treated according to the model and those treated according to the grower's standard program. Fruit yields in plots treated with iprodione, either according to the model or the grower's standard timing, were significantly higher than in the untreated controls in 1995 and 1996, but not in 1997. In 1998, the model will be further evaluated and the action threshold fine-tuned at four locations along California's central coast.

References

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Broome, J.C., J.T. English, J.J. Marois, B.A. Latorre, and J.C. Aviles. 1995. Phytopathology 85:97-102.

For more information: UC Sustainable Agriculture Research and Education Program, Davis, CA 95616; sarep@ucdavis.edu

The PestCast project can be found on the UC IPM Web site at: http://www.ipm.ucdavis.edu/DISEASE/california_pestcast.html

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Technical Review

California's Organic Agriculture - 1992-95

Laura Tourte and Karen Klonsky

UC Agricultural Issues Center, University of California, Davis, CA. 1998

A comprehensive report on organic farming in California has recently been published by the UC Agricultural Issues Center. Statistical Review of California's Organic Agriculture 1992-1995 contains detailed information on industry size, organic commodities, geographic distribution of production, farm profiles for registered and certified organic growers in California, and the state's registered handlers. The study is based primarily on information reported to the California Department of Food and Agriculture (CDFA) as required by the California Organic Foods Act (COFA) of 1990.

Industry trends, including patterns of entry and exit from the CDFA Organic Program are also discussed in the report, as are some potential impacts of proposed federal regulations for organic agriculture. Some of the key findings in this study are that:

- The number of registered organic farms increased from 1,157 to 1,372 for a total gain of 19 percent.

- Registered organic crop production acreage increased from 42,302 to 45,070, reflecting a more modest gain of 7 percent. (These figures exclude land that was double or multiple cropped, fallow land, land utilized for livestock production such as range and pasture, and land utilized for farm buildings, houses and roads.)

- The value of production for registered growers went up from $75.4 million in the first year to $95.1 million in the third year, posting an overall gain of 26 percent.

- Vegetable crops, and fruit and nut crops generated 95 percent of the total registered sales from approximately 80 percent of the state's registered acreage in all three years.

- The San Joaquin Valley accounted for the largest number of registered organic acres, with about one-third of the state total each year. The Sacramento Valley was second with approximately one-fourth of the total acreage.

- The Central Coast-Bay Area and San Joaquin Valley were the two regions that captured the highest revenues in all three years: combined they accounted for over half of the state's total sales value.

- In all three years over half of the value of registered organic production

was claimed by 2 percent of growers who grossed over $500,000 each.

Although registered organic agriculture accounted for less than 1 percent of the total value of production in the state in all three years (excluding livestock, poultry and related products), production generally has exceeded the state's rate of yearly increase in total agricultural value. The expanding market for California's organic production suggests considerable gains in production and marketing efficiency, enhanced consumer demand or both.

The information contained in the report would be valuable to farmers, agribusiness, policy-makers, public interest groups, educators, researchers and investors for making informed decisions about business strategies, teaching and research agendas, and institutional policies.

Statistical Review of California's Organic Agriculture 1992-1995 was prepared by Laura Tourte and Karen Klonsky, Department of Agricultural and Resource Economics, UC Davis, in cooperation with the California Department of Food and Agriculture Organic Program. The full report can be ordered by contacting UC Agricultural Issues Center, University of California, One Shields Ave., Davis, California 95616 Tel. (530) 752-2320, FAX (530) 752-5451. The cost of the report is $18.00 including shipping and handling.

For more information: Laura Tourte, Department of Agricultural and Resource Economics, University of California, Davis, CA 95616; ljtourte@ucdavis.edu

DEC.555 Contributed by Laura Tourte

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Technical Review

Establishing Native Forbs within Existing Stands of Native Perennial Grasses from Transplants and Seed on Rural Roadsides in the Sacramento Valley of California

Robert L. Bugg and Cynthia S. Brown

Presentation at 49th Annual Meeting of the American Institute of Biological Sciences, August 2-6, 1998, Baltimore, Maryland. 1998

Conventional management of county roads in California includes regular disturbance by herbicides, mowing, and blading. These practices promote ruderal, usually non-native, species. Previous experiments have evaluated establishment and persistence of seeded native perennial grasses in rural rights-of-way (see: Bugg, R.L., C.S. Brown, and J.H. Anderson. 1997. Restoring native perennial grasses to rural roadsides in the Sacramento Valley of California: establishment and evaluation. Restoration Ecology 5:214-228.). In the present two experiments, we tested establishment efficiency for native forbs (non-grass herbaceous plants) amid pre-existing stands of native perennial bunchgrasses or tilled, bare ground controls.

In the first experiment, a mixture of forbs was seeded into two levels of background vegetation: established perennial native bunchgrasses vs. tilled, bare ground. Arroyo lupin (Lupinus succulentus), California poppy (Eschscholzia californica), chick lupin (Lupinus microcarpus), and Spanish clover (Lotus purshianus) established well when seeded into tilled, bare ground, but the annual tansy phacelia (Phacelia tanacetifolia) and the perennials narrow-leaf milkweed (Asclepias fascicularis) and blue-eyed grass (Sisyrinchium bellum) did not. None of the forbs tested established well by direct seeding into pre-existing stands of native perennial bunchgrasses: canopy cover by forbs was significantly less in plots under the latter regime than in those with tilled, bare ground.

In the second experiment, two perennial forbs, warm-season active narrow-leaf milkweed and cool-season active blue-eyed-grass were grown in the greenhouse and outdoors in containers and later transplanted to the field. Container size, excavation method, and background vegetational regimes were varied. Small containers had volume 36 ml, depth 7.5 cm, and interior diameter at top 3 cm. Large containers had volume 105 ml, depth 13.6 cm, and interior diameter at top 3.6 cm. Excavation was by either dibble (impression) or corer (which removed soil from the hole). Transplants were inserted amid either tilled, bare soil or established perennial native bunchgrass stands.

Transplants inserted within plots of established native perennial bunchgrasses did not show significantly reduced vigor compared to those placed in tilled plots, but there was limited replication for this factor and thus little statistical power to detect such an effect.

Narrow-leaf milkweed performed better when grown in larger containers: its rapid growth phase begins late in the spring when rainfall is minimal and continues into the hot, dry summer, so transplants with deeper roots at the time of planting may have a resource acquisition advantage. By contrast, blue-eyed-grass did equally well when grown in either small or large containers: since its growing season is during the moist winter and spring, there probably was no advantage in having deeper roots at the time of transplanting.

Excavation technique did not affect narrow-leaf milkweed vigor, but blue-eyed-grass was more vigorous when excavation was by corer than when a dibble was used. We speculate that this may be due to the montmorillonitic clay soils, which swell and shrink in wetting and drying cycles, relieving compaction. The dibble method causes soil compaction, which may have interfered with growth of the cool-season perennial blue-eyed-grass, but compaction may have been reversed by the time narrow-leaf milkweed began rapid root growth in mid-spring.

Small containers and the dibble method present greater efficiencies of space and time for production and transplanting, so more detailed data and economic comparisons will be needed to assess trade-offs for establishing various forb species.

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DEC.596 Contributed by Robert Bugg

Resources

Print Publications

Vineyards Brochure

Vineyards in an Oak Landscape, by **Adina Merenlender** and **Julia Crawford**, 15 pages, 1998, University of California DANR Publication 21577. Based in part on research funded by UC SAREP, this brochure from the University of California Integrated Hardwood Range Management Program is directed at grape growers with vineyards next to woodlands and landowners considering vineyard development. It explores the physical, biological and social benefits of maintaining and restoring native vegetation in and around the vineyard, and offers practical information on how to assess land management decisions and balance agricultural production with natural resource conservation. In addition to information on oaks, the publication discusses biodiversity maintenance, riparian area and wetland conservation, erosion control, wildlife habitat, disease control, and economic incentives. To order, contact University of California, DANR Communication Services, 6701 San Pablo Ave., Oakland, CA 94608-1239; Tel: (800) 994-8849 or (510) 642-2431; Fax: (510) 643-547. The price is $4.50 (Calif. residents add 8.25% sales tax) plus shipping and handling. Payment can be by VISA or MasterCard (minimum $5.00), U.S. check or money order (payable to "UC Regents") or purchase order (minimum $25.00).

Ag Customers & Energy Restructuring

New Options for Agricultural Customers: California's Electric Industry Restructuring, produced by the California Energy Commission in cooperation with the University of California Small Farm Center, 20 pages, 1998. Free booklet outlining energy choices for farmers and other agricultural customers since the restructuring of California's electricity industry in March 1998. Contact the California Energy Commission's Energy Efficiency Hotline, Tel: (800) 772-3300 or (916) 654-5106; Fax: (916) 653-7480; email: ramon@energy.state.ca.us; Web site: http://www.energy.ca.gov/agprogram/

Cover Crop Book

Managing Cover Crops Profitably, 2nd Edition, Sustainable Agriculture Network, 212 pages, 1998. Building on the success of the first edition and responding to the demand for farmer-ready information, this publication explains how and why cover crops work and provides information on how to build cover crops into any farming operation. Billed as the most comprehensive book published on the use of cover crops to sustain cropping systems and build soil, it includes detailed charts of cover crop characteristics and management, adaptation maps, essays on soil fertility, crop rotations, pest management and cover crop selection, and 18 chapters on the most commonly used and widely adapted cover crops for the continental United States. Also

includes cover crop appendix, seed sources list, list of national cover crop experts, index, bibliography, and cover crop resources on the World Wide Web. To order the $19 publication, send a check or purchase order to Sustainable Agriculture Publications, Hills Bldg., University of Vermont, Burlington, VT 05405-0082; Email: san@nal.usda.gov; Web site: http://www.sare.org

Biological Control

Enhancing Biological Control: Habitat Management to Promote Natural Enemies of Agricultural Pests, edited by **Charles H. Pickett**, Biological Control Program, California Department of Food and Agriculture and **Robert L. Bugg**, UC SAREP, 421 pages, 1998 (late November). Includes six black and white illustrations, 75 figures, 48 tables. Field entomologists and farmers have recognized that conservation of natural enemies is important to effective biological control in many agricultural systems. This collection addresses an important gap in the biological control literature by providing the first comprehensive summary of recent findings on habitat manipulation to control pests. *Enhancing Biological Control* includes contributions from experts from U.S., Finland, Germany, Great Britain, People's Republic of China and Switzerland. Chapters cover habitat modification in fields, orchards or vineyards, and along or near the perimeters of fields, including hedges or other uncultivated areas. Generalist and specialist natural enemies are described in full, as are theoretical and practical issues. Experimental designs for studying enhancement are described, and the editors include a modeling study that explores how the dispersal of natural enemies interacts with the positioning of refuges. A valuable information source for researchers, farmers and agricultural consultants. To purchase the $50.00 hardcover book, contact the University of California Press fulfillment service at Tel: (800) 777-4726, Fax: (800) 999-1958 or order it from book stores.

SAREP WEB Information

http://www.sarep.ucdavis.edu

In addition to its print publications, UC SAREP offers access to SAREP-funded research and education projects, its newsletter, its latest *Biennial Report*, an interactive calendar, and information databases through its World Wide Web server.

Newly organized sections with new items:

Competitive Grants

http://www.sarep.ucdavis.edu/grants/

- *Requests for Proposals*
  http://www.sarep.ucdavis.edu/grants/request.htm
- *Competitive grants funded by SAREP*
  http://www.sarep.ucdavis.edu/grants/competitive.htm
- *Project Reports & Products*
  http://www.sarep.ucdavis.edu/grants/Reports/
- *Natural Beef: Consumer Acceptability, Market Development*

and Economics
http://www.sarep.ucdavis.edu/grants/Reports/nader/ *(see story at link)*

Crop & Livestock Production Information

http://www.sarep.ucdavis.edu/production.htm

- *Earthworm Information*
  http://www.sarep.ucdavis.edu/worms/
- *Cover Crop Resource Page*
  http://www.sarep.ucdavis.edu/ccrop/
- *PestCast (link to Statewide IPM Program Web site; collaborative work with Jenny Broome, SAREP):*
  http://www.ipm.ucdavis.edu/DISEASE/california_pestcast.html

News Releases/Media

http://www.sarep.ucdavis/news/pryear.htm

Sources of Funding

SAREP Requests for Proposals

SAREP is scheduled to release Requests for Proposals (RFPs) for three different kinds of grants: Sustainable Agriculture Research & Education Grants, Biologically Integrated Farming Systems Grants, and Methyl Bromide Research Grants in late October. For current information regarding proposal due dates, please refer to SAREP's Web site http://www.sarep.ucdavis.edu or contact SAREP grants manager, Bev Ransom at (530) 754-8546 or baransom@ucdavis.edu

SAREP has recently released RFPs to support educational events (up to $1,000 per event) and graduate student projects (up to $2,000 per individual).

Proposals are due **November 6, 1998**. Funds will be available in January 1999.

USDA-SARE Western Region Farmer/Rancher Research Grants

Producers and producer groups residing in the Western U.S. are invited to compete for grants to identify, evaluate and test their "in-the-field" sustainable agriculture practices through an effort sponsored by the USDA Western Sustainable Agriculture Research and Education (Western SARE) program. Individuals may apply for grants of up to $5,000; producer groups (three or more farm/ranch operations working cooperatively) may apply for up to $10,000. Western SARE will release a call for farmer/rancher research grant proposals October 15, 1998. Completed proposals will be due at the program's administrative office at Utah State University by 5:00 p.m.(Mountain Standard Time), **January 15, 1999**.

To request an application, contact Utah State University at (435) 797-2257 or wsare@mendel.usu.edu. The call for proposals will also be available on-line at http://ext.usu.edu/wsare/ All research proposals must be led by one or more producers, include a professional agricultural technical advisor, and provide a plan for sharing information with the community.

Organic Research Grants

The Organic Farming Research Foundation is offering funds for research on organic farming methods, dissemination of research results to farmers and consumer education. The next round of proposals must be received by **January 15, 1999**. Contact Grants Program, Organic Farming Research Foundation, PO Box 440, Santa Cruz, CA 95061; Tel: (831) 426-6606; email: research@ofrf.org;
Web site: http://www.ofrf.org

Fertilizer Research Awards

A Request for Proposals will be out in mid-January 1999 from the California Department of Food and Agriculture's Fertilizer Research and Education Program. Contact **Casey Walsh-Cady**, CDFA, (916) 653-5340; email:ccady@cdfa.ca.gov

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Calendar

*** SAREP WEB CALENDAR**

SAREP offers a regularly updated sustainable agriculture calendar on our World Wide Web site at: http://www.sarep.ucdavis.edu/ (click on "Course, Workshops, Events"). Please feel free to add sustainable agriculture events.

*** NATIONAL/INTERNATIONAL CALENDAR**

The National Agricultural Library maintains a calendar as part of AgNIC at http://www.agnic.org It links to more than 1,200 major national and international agricultural conferences.

*** MONTHLY MEETINGS**

Lighthouse Farm Network The Community Alliance with Family Farmers Foundation sponsors informal monthly meetings for growers to discuss issues related to pesticide use reduction. Contact: Reggie Knox, CAFF, (408) 457-1007.

OCTOBER

13

Biologically Integrated Orchard Systems (BIOS) Professional Development Workshop, Calif. State Univer., Fresno. Hands-on training for farm consultants, PCAs, agency & university staff. Biological farming topics covered: fall & winter pest control decisions in almonds, compost production & use, biological management in grapes, soil biology. Contact: Mark Cady, (530) 756-8518 ext. 20; bios@caff.org

15-17

150 Years of California's Golden Harvest, Hilton Inn, Sacramento. Sponsor: California Foundation for Agriculture in the Classroom. Workshops, roundtable sessions, field trips, resource fair & showcase of teacher-developed activities on integrating agriculture into all curricular areas. Free resources, lesson ideas, sources of materials & agricultural information for use in all grade levels. Invited speakers
include Ann Veneman, Bill Pauli, Kevin Starr, David Mas Masumoto. Contact: CFAITC (800) 700-AITC; http://www.cfaitc.org

23-25

The 1998 Bioneers Conference: Visionary and Practical Solutions for Restoring the Earth. Location: Fort Mason Center, San Francisco. Speakers: Riane Eisler on partnership economics, Pliny Fisk on natural design, Rosemary Gladstar on plant medicine, Malcolm Margolin on indigenous land

management, Cathrine Sneed on the Garden Project, Peter Warshall on biodiversity, Kent Whealey on Seed Savers Exchange. Contact: CHI/Bioneers Conference, 826 Camino de Monte Rey #A6, Santa Fe, NM 87505; (505)986-0366, contactus@bioneers.org ; http://www.bioneers.org/

DECEMBER

7-9

Annual Internat'l Research Conference on Methyl Bromide Alternatives & Emissions Reductions, Orlando, FL. Sponsors: Methyl Bromide Alternatives Outreach, The Crop Protection Coalition, US-EPA, US Dept. of Agriculture. Contact: Methyl Bromide Alternatives Outreach, (209) 447-2127.

JANUARY 1999

20-23

19th Annual Ecological Farming Conference, Asilomar, CA. Bus tour Wed.; workshops, speakers Thurs.-Sat. Contact: Committee for Sustainable Agriculture, 406 Main St., Ste. 313, Watsonville, CA 95076; (408) 763-2111; http://www.csa-efc.org

30-Feb. 2

33rd Annual Conference of the Association of Applied Insect Ecologists (AAIE), Santa Barbara, CA. Keynote: David Pimentel on Pest Management in the New Millenium, workshops. Contact: Max Jehle, (805) 792-3151, sailmax@aol.com; Nicholas Macris, (209) 897-7340, nmacris@jps.net; John Plain, (916) 441-5224, plainaaic9@aol.com

AUGUST

4-7

Global Soy Forum, 1st worldwide assembly of soybean producers, researchers, industry leaders, policy makers, consumers. Includes World Soybean Research Conference VI. Contact: Mary Auth, (217) 244-7384; gsf99@uiuc.edu; http://www.gsf99.uiuc.edu

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SUSTAINABLE AGRICULTURE is a publication of the UC Sustainable Agriculture Research and Education Program (SAREP). SAREP provides leadership and support for scientific research and education to encourage farmers, farmworkers, and consumers in California to produce, distribute, process and consume food and fiber in a manner that is economically viable, sustains natural resources and biodiversity, and enhances the quality of life in the stateÕs diverse communities for present and future generations. **SUSTAINABLE AGRICULTURE** is published three times yearly by SAREP staff from its UC Davis offices, with assistance from Creative Communications Services, UC Davis. Mailing address is: **UC Sustainable Agriculture Research & Education Program, University of California, One Shields Ave., Davis, CA 95616-8716.**

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