

# UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

## KERN COUNTY FARM AND HOME ADVISORS

### 2008 ANNUAL REPORT



**UNIVERSITY OF CALIFORNIA**  
**AGRICULTURE & NATURAL RESOURCES**  
**COOPERATIVE EXTENSION KERN COUNTY**



# UC Cooperative Extension Kern County Farm and Home Advisors

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## Who We Are and What We Do

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Cooperative Extension is the informal off-campus educational arm of the University of California. We are a part of the Land-Grant College System that, since 1914, has provided the citizens of California and Kern County with programs to improve their quality of living. Our informal educational programs have focused on: (1) agriculture and natural resources; (2) family and consumer sciences; (3) community resource development; and (4) 4-H youth development.

In Kern County, we are most commonly recognized as the Farm and Home Advisors Office. Cooperative Extension advisors are your local representatives of the University of California and the resources of the institution are as close as your telephone and a local call.

We have over 3,000 different University, USDA, and locally produced publications, most of which are provided with little or no charge. Advisors are available for consultation on your particular problem at no charge.

Cooperative Extension provides homeowners and urban gardeners information on a wide variety of subjects such as gardening, home orchards, house plants, pest control, diagnosis of problems, etc.

- ▶ The **4-H Youth Program** is locally administered through the Cooperative Extension Office. Over 1,200 Kern County youth between kindergarten and age 19 are currently enrolled. Over 400 adult volunteer leaders assist with this program.
- ▶ **Farm advisors** with various commodity and livestock assignments work primarily with commercial agriculture to improve production and quality, and to enable consumers to enjoy a reasonably priced, wholesome and nutritional food supply. Their experience and knowledge are extended to the urban public through publications and consultations.
- ▶ **Environmental Horticulture.** Shade trees and turfgrass make city and suburban areas more livable. The environmental horticulturist provides problem-solving information related to ornamental plants and home fruit and vegetable production. A Master Gardener program provides further education and outreach opportunities.
- ▶ The **Nutrition, Family, and Consumer Science Advisor**, using the “Train the Trainer” model, instructs professionals, agency staff, and community volunteers to conduct a broad array of family and consumer education programs. These include money management, parenting, lead poisoning prevention, and family literacy. The Nutrition, Family Consumer Science Advisor also answers consumers’ questions regarding food safety and food preservation.
- ▶ An **Expanded Food and Nutrition Education Program** is directed at those families near and below the poverty income level. The main thrust of this program is teaching nutrition, food preparation and shopping skills. The Youth EFNEP program provides nutrition curriculum and training to schools serving low-income children.

## ***Letter from the Director***

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***Darlene Liesch, County Director***

The name Farm and Home Advisor's Department does not really give a clear picture of this unique department within the Kern County system. In fact, University of California Cooperative Extension also leaves a lot to the imagination. One of the missing pieces of both names by which we are known is the youth element. In addition to our vital link with agriculture and our successful nutrition education program, this department is the home of the 4-H Youth Development Program in Kern County.



As the years have progressed, 4-H has broadened its base. We have more than 4-H Clubs, we now have a 4-H Youth Development Program that encompasses many other ways of delivering 4-H hands-on opportunities to youth.

In Kern County we are particularly fortunate because we have a terrific 4-H Youth Development team. As you will read in this report, we have a healthy 4-H Club Program that is successful thanks to a large number of wonderful volunteer leaders from the community and a 4-H Program Representative that works with the club program.

Because of special funding from the Board of Supervisors, we were able to expand our successful Summer Outreach Program. A full-time 4-H Program Representative was hired for this project. A new 16 week program was offered to children to teach them the values and discipline it takes to be successful in life. Through interactive activities and dialogue in the "Growing in Life and Business" program, the participants from high-risk environments learned about themselves and the importance of team-building and social skills.

Another team member is our 4-H Program Representative who is the Assistant Project Director for Operation Military Kids in California. This staff person collaborates with community agencies and service branches, and implements programs that educate the public about military family needs. He connects military children with resources, social enrichment, recreational activities and educational opportunities.

Our 4-H Youth Development Advisor holds the team together. In addition to his administrative role, he is involved with research projects and creative activities that translate into effective programs for youth.

Making the right choices and having the opportunity to see positive alternatives so the right choices can be made – that is what this is all about. Offering programs to the youth of Kern County to help them develop leadership, citizenship, and life skills is the goal of the 4-H Youth Development Program and the team of UCCE staff and volunteers.

Darlene Liesch  
County Director



# ***Citrus, Pistachios and Subtropical Crops***

***Craig Kallsen, Farm Advisor***

## **Program Description:**

The Kern County Farm Advisor for subtropical horticulture is responsible for research and an educational outreach program for Kern County growers and pest control advisors of citrus (approximately 60,000 acres) and pistachios (approximately 60,000 acres) primarily, as well as for miscellaneous permanent crops such as persimmons, pomegranates, olives and figs.



## **Projects/Applied Research:**

Every third year, the University of California Cooperative Extension Pistachio Farm Advisors sponsor a four day short course designed to provide information to both potential and new pistachio growers. Kern County has more acres of pistachios than any other county in the nation. Over 100 people attended the 2008 pistachio short course which included extensive classroom teaching and a full day field tour in commercial pistachio fields.

## ***EXTENSION AND IMPACTS OF THE PISTACHIO CULTIVAR EVALUATION PROJECT***



**Farm Advisor Blake Sanden speaking at the University of California Pistachio Short Course**

Two female pistachio varieties ‘Golden Hills’ and ‘Lost Hills’ and the pollinating male called ‘Randy’, which were bred, selected and released to growers in Kern County by the University of California in 2005, are increasingly being planted in the San Joaquin Valley of California. The first commercial harvests for these varieties will occur in 2010. Evaluation of the oldest existing trees of these varieties, located in experimental trials, continues. ‘Golden Hills’ and ‘Lost Hills’ are ready for harvest approximately two weeks earlier than ‘Kerman’ the industry standard, and produce high yields of edible, split, inshell nuts.

Several other pistachio selections with possible commercial potential have been identified in younger experimental plantings. Some of the desirable characteristics of these selections, if proven, include an earlier harvest than ‘Golden Hills’, larger nut size than average, and greater shell-hinge strength. However, more years of evaluation will be required before any possible release by the University of California. This project is a cooperative effort among University of California Cooperative Extension farm advisors, Dr. Dan Parfitt, a U.C. Agricultural Experiment Station Pomologist; Dr. Ted DeJong, a professor in the University of California Department of Pomology and several cooperative growers and pistachio nut processors in Kern and Madera Counties. Results from this project, and other research projects, are regularly presented to growers in written industry reports, in written and electronic newsletters, and in classroom meetings.

## **IMPACTS OF DEFICIT IRRIGATION ON FRUIT YIELD AND QUALITY PARAMETERS OF NAVEL ORANGE**

The data-gathering component of a three-year project studying the effects of late-season irrigation stress on early-maturing navel oranges was completed in 2008, and analysis of the results will be completed in early 2009. The experiment is being conducted by Farm Advisors Craig Kallsen and Blake Sanden in Kern County, in cooperation with Dr. Mary Lou Arpaia, a University of California Cooperative Extension Specialist who is conducting scientifically controlled taste tests of fruit harvested from the experimental plots. Kern County is known for its production of early-maturing oranges. To ensure a minimum level of quality, oranges may not be picked until the rind has reached a legally-defined level of orange color, and the juice a minimum concentration of sugar and acid.



**Beck early navel orange tree plot marked for experimental harvest**

In this experiment, beginning in late August less irrigation is applied to some trees in an orchard than would normally be required and the stress is applied through harvest in late October. The resulting degree of stress applied to the trees is being carefully monitored through plant water potential, applied water and soil-water storage measurements. This experiment is delineating the tradeoffs encountered among yield and fruit quality parameters when growers may be forced to reduce irrigation due to drought or may want to experiment with reduced water application to promote an earlier harvest for greater profit. Three years of results show that deficit irrigation can increase the rate of development in the fruit of orange color, sugar, and acid but at the expense of decreased yield, fruit size, and some quality. Trees that were stressed by the levels of drought applied in this experiment recovered yield and fruit quality levels of unstressed trees when irrigated fully the following year. Results from this experiment will be presented at the Kern Spring Citrus Meeting, in newsletters such as “Topics in Subtropics” and published in scientific journal articles.



**Weighing and preparing pistachio nut samples in preparation for quality evaluation**

# Cotton, Corn and Small Grains

**Brian Marsh, Farm Advisor**

## Program Description:

As Farm Advisor, responsibilities include the development and implementation of educational programs and applied research projects to address short and long term goals to meet clientele needs in cotton, corn and small grains. As Center Director, responsibilities consist of managing Center resources to support the Division's research and educational objectives. Other duties include assisting in setting program priorities, resource planning and development of support for field research and providing for continued availability and allocation of Center resources for UC, USDA, and cooperating researchers.



## SPECIFIC HIGHLIGHTS

*Fusarium oxysporum* f.sp.*Vasinfectum* (FOV) is a widely spread soil borne fungus that attacks cotton and other plants. FOV causes a general wilt, with symptoms that include leaf yellowing and necrosis beginning at the leaf margins. The vascular system of infected plants becomes “plugged up” from the fungus and the plant's defense response to the infection. For previously identified races, infection



Vascular tissue discoloration from FOV Race 4

occurred through injury caused by root knot nematodes. Root knot nematodes are most widely found in coarse texture soils in the San Joaquin Valley. Crop rotation or chemical applications will reduce nematode population below economic thresholds. A new race of FOV, Race 4, has been identified in California. The difference with Race 4 is that it can infect cotton plants in the absence of nematodes, causing infections in both coarse and fine textured soils. Generally, Pima cotton varieties are more susceptible to FOV Race 4 than Acala or other upland varieties.

Researchers from the University of California and USDA Agriculture Research Service housed at the UC Shafter Research and Extension Center and UCD Plant Pathology Department have attacked the problem in three different areas. Methods for early identification have been developed.

Researchers have further described the FOV life cycle and identified methods and plant parts that could potentially spread the organism. Best management practices, including phytosanitary procedures, have been developed to reduce or prevent FOV spread within and between fields. Other research has been conducted on cotton plant resistance. Hundreds of varieties and breeding lines have been evaluated in the KREC greenhouse for resistance to FOV Race 4. Field evaluations have been conducted on the most promising varieties to further verify resistance. The process is underway to categorize the genes that convey resistance and identify molecular markers for those genes. This greatly aids breeding programs that are underway in developing additional Race 4 resistant varieties. Additional information is available at <http://cottoninfo.ucdavis.edu/IMAGES/Fusarium.pdf>.

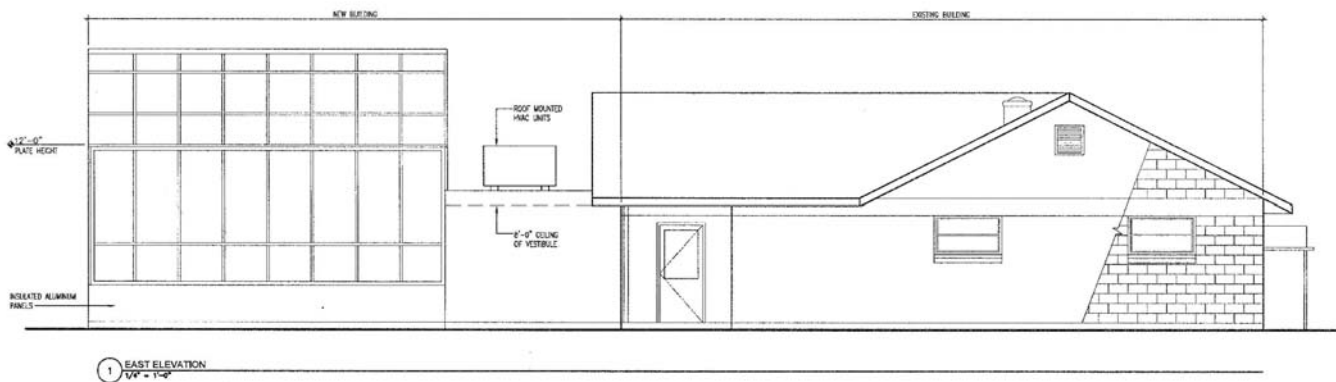


## Impacts:

Cotton production in the San Joaquin Valley has shifted to a greater emphasis on Pima cotton. The high quality of Pima cotton commands a premium price. The identification of resistant Pima varieties has been of crucial importance to the continued success of the industry. Based upon our research findings, California cotton growers are able to continue to plant resistant Pima cotton varieties in areas that have confirmed presence of FOV Race 4. The use of resistant varieties is one of the best management practices to reduce the spread of FOV. More than 95 percent of the 2007 Pima cotton crop, 832,000 bales, was purchased by overseas mills, contributing more than 550 million dollars to the state economy and improving the U.S. trade balance.

## **SHAFTER RESEARCH AND EXTENSION CENTER**

Twenty-one field research projects for 10 UC and USDA researchers were conducted at the Center in 2008. The 6 resident researchers also conducted studies in laboratories and greenhouses. One area of research is cotton germplasm development, including the evaluation and identification of molecular markers for novel traits. Ten field projects and 3 laboratories are dedicated to insect research including identifying resistant varieties, biological control, establishing economic thresholds and pesticide efficacy evaluations. The remaining projects address agronomic management of cotton, black-eyed beans and corn including water use efficiency through low pressure drip irrigation. Over 500 people attended the numerous extension meetings, field days, and tours. The transfer of Center property from Kern County to UC has allowed for pursuit of additional funds for building expansion and improvements in addition to the continued repair and renovation of existing buildings. Approximately \$200,000 is spent on operation and maintenance of facilities. Construction of a new conference room and bio-safety II greenhouse have begun. These projects total 1.25 million dollars from federal and UC grants.



# ***Entomology and Pest Management***

***David Haviland, Farm Advisor***

## **Program Description:**

The Kern County Entomology Advisor is responsible for research and education programs related to insect pest management in the southern San Joaquin Valley. These programs focus on the development of integrated pest management (IPM) strategies that are safe, effective and economically practical. Where possible, special emphasis is given to the development of strategies that rely on biological and cultural controls that don't require the use of pesticides. In cases where pesticides are needed, research and extension programs focus on how to utilize newer, reduced-risk products in a judicious manner as alternatives to the more toxic organophosphate, carbamate and pyrethroid insecticides that dominated during the past few decades.



The Kern County Entomologist has the responsibility of being knowledgeable on issues related to insect pest management on all commodities grown in Kern County. He uses this knowledge to advise growers and pest control advisors on the best management strategies available. Where information is incomplete or lacking he develops research programs, either on his own or in conjunction with a network of UC entomologists and other researchers, to help solve the problem. This is particularly true for situations where new exotic pests arrive in Kern County for the first time.

## **Applied Research - 2007 Highlights:**

### ***MANAGEMENT OF VINE MEALYBUG IN TABLE GRAPES***

Vine mealybug has become one of the most significant pests of table grapes in Kern County. Mealybugs damage the vines by feeding on plant juices and by contaminating clusters for the fresh market. In 2008 we began a research project to evaluate chemical and non-chemical control strategies such as mating disruption and biological control. The results of these trials have been broadly distributed throughout Kern County and further disseminated throughout much of the rest of the state. They have helped growers to improve vine mealybug control in the field while also improving the adoption of reduced-risk management strategies such as mating disruption and biological control that are more environmentally-friendly than traditional control strategies.



### ***PACIFIC SPIDER MITE CONTROL IN ALMONDS***

Spider mites are one of the most important pests of almonds in California. Over the past few years we have done research to determine the best management strategies for this pest. In 2008 we continued these efforts by doing large scale research and demonstration plots to provide valuable data on control options, but that were also large enough in scale to serve as examples to local pest control advisors of how this pest can be managed.

## ***BIOLOGY AND MANAGEMENT OF CITRUS THRIPS IN BLUEBERRIES***

Blueberries are one of the newest crops being grown in the San Joaquin Valley and are being attacked by a pest called citrus thrips. The year 2008 marked the third year of our research that has documented the basic biology of this pest, how it interacts with the blueberry crop, and how to manage it. Our management research included work with *Beauveria bassiana*, a fungal disease of the thrips that has potential to assist in control without the use of insecticides. We also did other organic research on how to manage the thrips by improving plant quality through the use of overhead sprinklers that both aid plant growth and reduce thrips populations. Results of our work are being incorporated by many blueberry growers in their efforts against this pest.



## ***MANAGEMENT OF NAVEL ORANGEWORM IN ALMONDS AND PISTACHIOS***

During 2008 we continued our research on navel orangeworm management in almonds and pistachios. Navel orangeworm causes direct damage to almond and pistachio kernels by feeding on them and by causing increased infection levels by aflatoxins that can cause entire ship containers of nuts to be rejected from overseas markets. Our project focus in 2008 was to screen approximately 20 new insecticides for their effects against navel orangeworm when sprayed at hull split. Many of these products

work by means that are safer to humans and the environment than existing products, and some are more effective. Our efforts are helping to determine the best tools growers can use and are providing them with information that can help them balance the needs of producing a damage-free crop with their efforts to protect the environment and remain profitable.

### **Extension and Education Programs - 2008 Highlights:**

#### ***IMPROVED ADOPTION OF INTEGRATED PEST MANAGEMENT PRACTICES IN ALMONDS AND PISTACHIOS***

During 2008 we sponsored a series of field meetings that each targeted a specific pest management issue in almonds or pistachios. Some issues included navel orangeworm management in almonds and pistachios, spider mite management in almonds, and mealybug and small bug management in pistachios. Each of the meetings brought together University and Industry expertise and provided an environment for the sharing of research, observations, and field experience.

At the end of the year we sent a survey to 87 individuals that both attended the meetings and provided us with their e-mail addresses. Of those, the 40.2% that returned our survey reported that information from the meetings was routinely considered when making pest management decisions by individuals that influence 161,750 acres of tree nut crops. The same 40.2% of attendees that returned our survey reported that information from the meetings was routinely used to improve their practices by growers and PCAs that influence 83,750 acres of nut crops. Currently in the lower San Joaquin Valley, this amount of acreage conservatively produces over \$300 million annual in nut crop products.

# ***Environmental Horticulture/Environmental Science***

*John Karlik, Advisor*

## **Kern County Outreach:**

### ***MASTER GARDENER CLASSES***

The climate and relative affordability of housing in Kern County allow individuals to practice horticulture at home, to improve the environment, improve aesthetic qualities of their neighborhood, and produce food at home. A large commercial landscape industry also exists.

Two 16-week Master Gardener classes were held during fall, 2008

- Master Gardener I class with an enrollment of 52
- Master Gardener IV class with an enrollment of 28



Topics discussed included:

- Soil properties and their modification
- Plant selection and placement
- Tree planting and staking
- Pruning practices
- Small-scale fruit, citrus, and vegetable production
- Irrigation and water conservation
- Non-chemical pest management
- Plants and air quality



In the MG IV class we discussed several topics pertaining to plants and the environment, and had a field trip to the Los Angeles City and County Arboretum.

Topics discussed included:

- Air pollution and chemistry of the lower atmosphere
- Atmospheric particulate pollution and visibility reduction
- Chemical fate and transport in the environment
- Climate change and implications for plant selection
- Sustainable agriculture

Kern County is the only county in California in which a series of Master Gardener classes is offered. This year represented the first time an MG IV class has been offered. Survey data indicate these classes were well-received and participants changed horticultural practices as a result.

## **Impact:**

Presentation of up-to-date horticultural information for Kern County. Delivery of information to reduce home pesticide use, conserve water, and enhance the urban environment.

## **PRUNING DEMONSTRATIONS FOR FRUIT TREES**

*Collaborator: Mario Viveros, advisor emeritus, UCCE Kern County*

The climate of Kern County allows a greater range of home fruit trees species to be grown than in many locations. To maintain yield and prolong tree life, pruning is necessary for deciduous fruit trees. However, it is difficult to teach or to learn pruning in a classroom setting or from photographs or books. Therefore, we offer these free demonstrations on an annual basis for all interested Kern County residents. We also make available fruit tree publications we wrote, which were printed through the county reprographics service. Two pruning demonstrations were held in December.

### **Impact:**

Improved pruning practices for fruit trees.

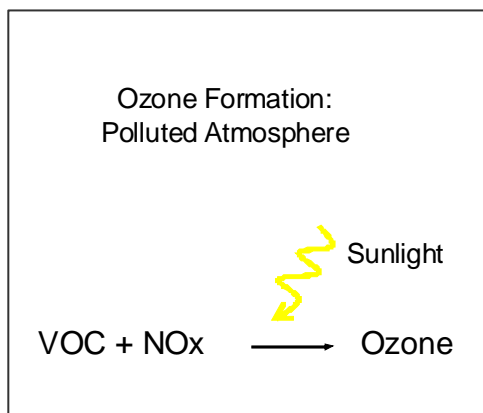
## **AIR QUALITY RESEARCH: Measurements of Biogenic Precursors to Ozone and Particulate Matter in the Central Valley**

*Collaborator: Allen Goldstein, UC Berkeley*

Green plants contribute reactive VOC to the atmosphere, and for effective air quality policy this background source needs to be measured and taken into account. The current project follows on past work measuring emissions from plants found in urban landscapes. For agricultural crops, emission measurements have not been made using advanced instrumentation. In this calendar year we have made enclosure and cartridge measurements for 20 crops found in large acreages in the San Joaquin Valley. Analytical techniques have included gas chromatography (GC), GC-mass spectroscopy, and proton-transfer reaction mass spectroscopy (PTR-MS).

### **Impact:**

Crops measured have had low, but non-negligible, emission rates of OC. These data will inform ARB (California Air Research Board) and aid in developing better air quality attainment strategies.



- Enclosure technique
- Measurement of quantity and identity of emissions along with plant physiological properties



# 4-H Youth Development Program

*John Borba, Advisor*

## Program Description:

4-H is a nationally recognized youth development program which promotes citizenship, leadership, and life skills. In California, the program is administered by the University of California Cooperative Extension. 4-H is open to youth five through nineteen years of age. Kern County hosts more than forty traditional clubs which serve more than one thousand members and four hundred leaders. In addition to the club program, special outreach projects are offered to both urban and rural youth.



## Highlights:

### **4-H OUTREACH PROGRAM**

Having a child participate in an organized youth program such as 4-H, sports leagues, etc. is not always an option for some families. Lack of transportation, distant locations, high costs, and minimal parental involvement are factors that can deny youngsters the opportunity to become active in a program that will benefit their growth and development. The 4-H Outreach Program is provided as an educational extension project through the Kern County 4-H program to low income youth and families.

## Extension Methods:

A 4-H Program Representative was hired to implement the program based on the long running 4-H Summer Outreach Program which takes place in Kern County. The program involves the staff member visiting youth serving locations throughout the community and engaging them in hands-on learning projects that teach as well as entertain.



4-H Members eating smores at 4-H camp

## Results/Impacts:

Several hundred youth have participated in the program with the vast majority coming from lower income families. The highlight of the program was a summer camp where forty-five of these urban youth participated in traditional resident camp activities such as crafts, archery, and horseback riding.

## **4-H STUDY OF POSITIVE YOUTH DEVELOPMENT**

Tufts University is sponsoring a nationwide study of positive youth development. The study has taken place in a number of states and involves surveying non-4-H members and 4-H members to evaluate factors that create positive influences in the lives of young people. In 2008 the study was brought to California and coordinated through the State 4-H Office at UC Davis. The goal was to get as many counties in California to participate by surveying youth in grades nine through eleven.

### **Extension Methods:**

Because of our past collaborations, the Boys and Girls Club of America (BGCA) were open to the idea of participating in the survey using BGCA members. They secured non 4-H youth to participate in the online version of the survey utilizing their on-site computer laboratory. High school 4-H members were secured to participate in the online survey at the University of California Cooperative Extension Office. The online survey takes over an hour to complete and queries youth in areas regarding safety, risky behavior, relationships and self perception.

### **Results/Impacts:**

Kern County provided the highest number of survey participants resulting in valuable and immediate research data for this national project. Tuft's University will be analyzing the survey results and will make the data available when they have completed their processing.

## **EDWARDS AIR FORCE BASE 4-H PROGRAM**

The U.S. military and 4-H has a long history of cooperation and joint activities. This year we were able to further our support to Edwards Air Force Base by securing a grant which allowed us to train their staff, purchase supplies and equipment for their program, and employ a temporary part-time worker to serve as a 4-H leader/instructor to the base Morale, Welfare & Recreation staff.



4-H outreach member launches her model rocket at Edwards Air Force Base

### **Extension Methods:**

The 4-H staff member implemented a 4-H program at the base which took place twice a week for eight weeks during the summer and exposed the base staff and the dependent military youth to four different 4-H project groups: photography, foods & nutrition, arts & crafts, and aerospace & aviation. The culmination of these efforts was the formation of the "Freedom Fighters 4-H Club". These youth participated in the projects at the base and also became involved in other 4-H activities to include exhibiting their project work at the Kern County Fair.

### **Results/Impacts:**

The staff at Edwards Air Force Base worked side by side with the 4-H staff member and received hands-on experience in 4-H programming which will enable them to enhance their efforts in providing youth development activities at the base. At the conclusion of the summer program the Edwards Air Force Base staff also participated in "4-H 101" training to further improve their skills.

# Irrigation and Agronomy

Blake Sanden, Farm Advisor

## General Program Summary

### IRRIGATION & SOILS

This portion of my program focuses on two major areas:

- 1) Irrigation system management - optimizing efficiency and profitable water use
- 2) Salinity/fertility management - crop salt tolerance, soil quality, amendments and nutrient availability



### AGRONOMY

Research and advising on all phases of production of alfalfa and forage crops, dry beans, sugar beets and safflower. Grower consultations to identify problems. Develop improved varieties.



Helping growers understand new technology for field water monitoring

### Educational & Professional Outreach For 2008

**Methods:** Presentations at local, state and national meetings, field days plus individual consultation through farm and phone calls.

**Impacts:**

- 5 Kern County meetings/workshops
- 11 other county meetings
- 18 professional/university meetings
- 3 newsletters, 3 popular press article
- 90 farm calls and office consultations
- 1754 people served

### IRRIGATION MANAGEMENT & MONITORING (ON-GOING PROJECT – 2008 update)

**Situation:** Increased water costs, variable field characteristics and crop water consumption mean growers have to be more efficient. New technology for field water monitoring developed in the last 8 years can be very helpful to growers, but the amount of new technology on the market is often confusing and needs “on the ground” demonstrations.

**Methods:** Install/demonstrate a simple logger and soil moisture sensor combination paid for by growers. Document irrigation efficiency and “user friendliness” of technology. Conduct workshops.

**Impacts:**

- Monitoring, loggers/sensors installed:
  - 12,600 acres over 143 fields
  - 35 different growers
  - 14 different crops
  - 11 soil textures
  - 9 different irrigation system types
  - Average water use efficiency: 95%



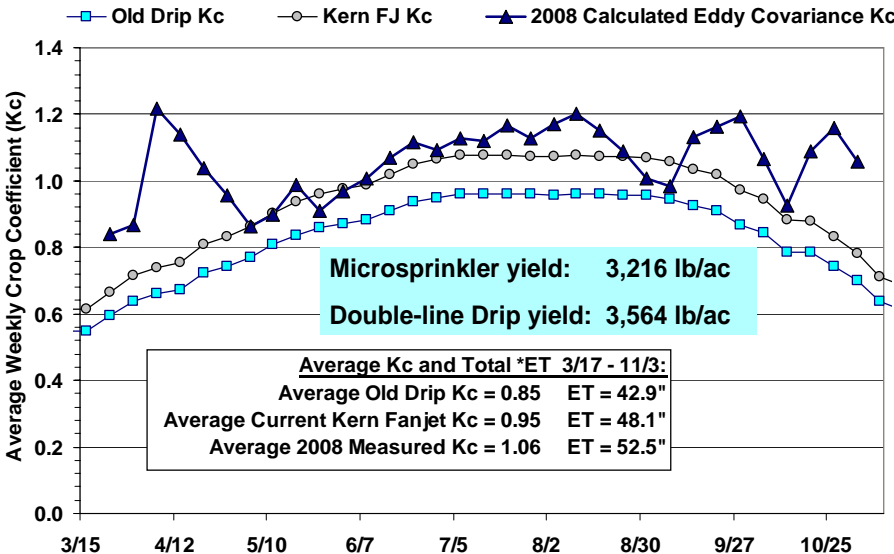
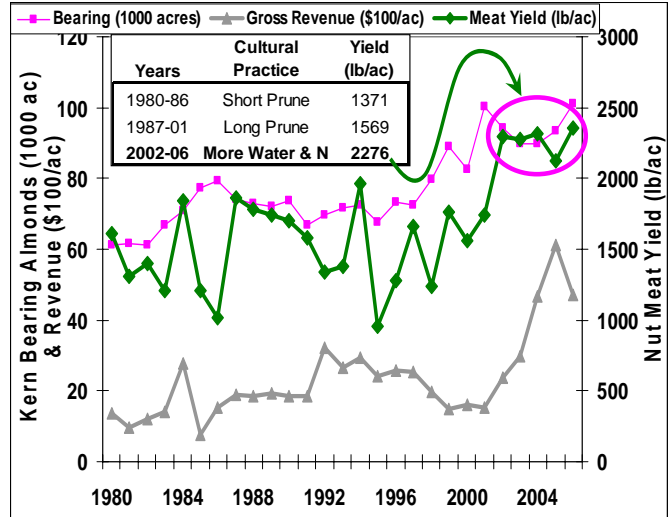


**DETERMINING OPTIMAL WATER USE & FERTILITY IN ALMONDS**

**Situation:** Urban water demand in California is increasing. New dams and supply are not being developed. Environmentalists and many legislators believe that we can meet increased demand through mostly ag and some urban water conservation alone. But at the same time, groundwater levels across the state have declined significantly, indicating insufficient surface water for irrigation with basin water use efficiency near 100% to meet demands. Kern almond yields have nearly doubled in the last 20 years due to improved management and more water. Accurate understanding of optimal water and fertilizer use is essential to maximize efficiency and yield.

**Methods:** Using meteorological instruments and soil water data to a 9 foot depth we are monitoring almond water consumption for fertilizer rates ranging from 50-150% of the estimated nutrient requirement in the largest tree fertility/water use trial ever conducted in California (2008-12) as a joint project with researchers from UC Davis.

**Impacts:** Water use in almonds has increased by 15 to 25% over the last 15 years due to improved irrigation management and average yields by 50-100% (above chart). While this takes more water the net efficiency of yield/gallon of water has increased. Measured almond water use (ET, below figure) in the first year of this trial was even higher than our earlier estimates from the Monitoring Project. Average yields of more 3,500 lb/ac nut



meats are possible. The high degree of irrigation efficiency in most Kern almonds, coupled with this high water use and lack of winter rainfall has also caused salts to accumulate and reduce yields in many orchards.

# ***Nutrition, Family and Consumer Science***

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***Margaret Johns, Advisor***

## ***MONEY TALKS FINANCIAL LITERACY PROGRAM***

Money Talks is a national award winning financial literacy program for teens. The original project began in 1998 with a survey of 323 teens that identified money management topics teens wanted to learn about and how teens wanted to receive the information. Teens have assisted in all aspects of program development, pilot testing and program evaluation to ensure the curriculum would appeal to teens. This curriculum is truly research-based.



Of note is the key decision to sample teens from diverse backgrounds: 1) teens in public high schools, 2) teens in youth groups, 3) teens participating in pregnant parenting programs, 4) teens participating in migrant education programs, and 5) incarcerated teens. This led to the development of four series of teen and leader's guides and a corresponding website <http://moneytalks4teens.ucdavis.edu>.



The program development and design also supports adults who teach teen financial literacy in both in school and out-of-school settings. The Money Talks Curriculum has grown from four initial teen guides to 15 teen guides with a website, 3 videos, ten interactive web-based games, a DVD, a section on frequently asked questions and a leader's guide for each teen guide.

We know of no other financial literacy program for teens that was developed based on the needs and desires of teens. The information is provided in formats that could be used in the four most popular methods teens indicated they wanted to learn about money management—in school and out-of-school, through newsletters/magazines, on the web and through youth organizations. The curriculum is developed to be flexible by providing teachers and leaders with options for interactive and experiential learning, individual and group work, the use of traditional and new educational approaches, and self-learning and discovery through interactive games. The choice of English or Spanish versions increased its applicability and usefulness in most settings.

### **Extension Methods:**

Kern County has been a major contributor to this statewide project. The original four teen guides were pilot tested at Centennial and East Highs, Nueva Continuation School and the Mojave ROP programs. The finance class at the Bakersfield ROP program pilot tested the Banking and Credit teen guides. A 10-year follow-up survey was recently finished in 12/08. The Kern County Probation Department, CSUB Migrant Education Program, Nueva, Golden Valley High School, and Clinica Sierra Vista's Adolescent Family Life program all participated in collecting data for the 2008 survey.

## Results/Impact:

The Money Talks Series is helping teen improve financial literacy. Pre/post evaluations were used to evaluate the effectiveness of the Money Talks Series along with retrospective data regarding behavior changes. Each teen guide has been evaluated separately and as part of their series. The results indicate that teaching a financial curriculum does improve the financial literacy level of high school students. Self-reported data indicate that both financial knowledge and appropriate behavior increased after participation in the Money Talks Series. Increased scores on the savings scale indicate that savings attitude and behaviors improved after the teens took part in this program. The participants demonstrated better choices when shopping—they were more likely to compare prices and wait until items were on sale. The subjects were also more knowledgeable about ways to decrease the cost of auto insurance—a major expense for young people; how to use credit and banks, and the best times to shop for food. Teens reported increased number of times talking with their family about their use of money, the importance of savings, family finances and how the family's money should be spent. This program is currently being used by 49 states and 20 countries.

## Teen Guide Series:

- **Money Talks, Should I Be Listening?**
  - *My Money Personality*
  - *Savings Made Simple*
  - *Shopping Savvy*
  - *Car Cost*
  - *Hunger Attack*
  - *Privacy Please*
  
- **Money Talks, Should I Be Banking?**
  - *Savings Account Strategies*
  - *Taking Charge of Your Own Checking Account*
  - *The E-Banking Experience*
  
- **Money Talks, Should I Be Charging?**
  - *Keys to Credit*
  - *Should I Be Charging?*
  
- **Money Talks, Should I Be Working?**
  - *My Job Personality*
  - *Job Search*
  - *On the Job*
  - *Making My Own Job*



# Vegetable Crops/Plant Pathology

Joe Nunez, Farm Advisor

## Program Description:

There are approximately 32 different vegetables planted for commercial production on over 91,000 acres of Kern County farmland with a total value of over \$330 million. As the vegetable advisor, it is my responsibility to identify, prioritize and meet the needs of the vegetable industry by establishing an applied research program to solve local vegetable production problems. I extend new research-based information with an ongoing education outreach program through the use of meetings, newsletters, farm calls, and mass media. In addition, I help answer questions and solve problems for the general public in areas that I have some expertise.



## PEPPERS

Bell peppers and chile peppers in Kern County have been afflicted by cucumber mosaic virus (CMV) for the past several years. Some fields have had over 50% yield reduction due to CMV. There is no pattern as to when it will appear or how severe the infection will be. The earlier in the season that it does appear, however, the more severe the yield loss is.

CMV is a cucumovirus that is vectored by several different species of aphids, but most efficiently by *Aphis gossypii* and *Myzus persicae*, the cotton aphid and the green peach aphid respectively. It is transmitted in a non-persistent manner, meaning the aphid vector acquires the virus after only a few minutes of feeding on an infected plant and that it can only transmit the virus for a few hours afterward.



Even though the plants are being treated with a systemic insecticide from the time they are young seedlings, fields are still being infected with CMV. The reason for this is most likely because once an aphid lands on a plant surface it immediately begins to probe the plant to see if it is a suitable host plant. Once this probing begins the virus is transmitted to the plant. Even if the aphid is killed by the insecticide, it is not killed quickly enough to prevent the vectoring of the virus. Although treating pepper fields with imidacloprid does reduce the buildup of aphids in field, it does not prevent viruses from being introduced to a field.

## Applied Research:

A trial was conducted in spring of 2008 with bell peppers to determine if CMV can be controlled by insect repellents, reflective mulch, and insect barriers. The insect repellents are composed of botanical oils that are commercially available. The botanical oils tested were: A) 40% citronella oil; B) 25% citronella oil, 25% clove oil, and 5% of geranium oil; C) 20% clove oil and 10% rosemary oil; D) 5% garlic oil; and E) 3% citronella oil and 0.5% garlic oil. Other treatments included a floating row cover and silver reflective mulch.



The trial was evaluated for aphid counts on a weekly basis by placing yellow sticky cards just above the plant canopy. The impact of CMV was determined by harvesting the bell peppers over the course of several weeks. Aphid counts were significantly reduced by the floating row cover and silver reflective mulch as compared to the control. The aphid counts were not different for any of the botanical oils compared to the control. At harvest, the floating row cover and silver reflective mulch had significant yield increase over the control plots. The botanical oils plots yielded the same as the control plots. The use of silver reflective mulch and floating row covers can reduce the incidence of CMV in peppers.

### **Extension of Information:**

The results of the trial were released to the Kern County growers and others through the Kern County Vegetable newsletter. Results were also released as an annual report to the California Pepper Commission which sponsored this research. It is sent out to all of their clientele as an annual report and a year meeting. The results were also presented at the International Pepper Conference in October of 2008 in New Jersey. This trial was also highlighted in an East coast vegetable trade magazine.

### **Results/Impacts:**

One Kern County grower has already committed to using reflective mulch in 2009.



# Viticulture

*Jennifer Hashim-Buckey, Farm Advisor*

## Program Description:

The Viticulture Farm Advisor provides a broad based, off-campus education and research program in the fields of viticulture (with an emphasis on table and wine grapes), small fruits production, post-harvest handling and pest/pathogen management for local growers, agricultural associations, governmental agencies and homeowners in Kern County. Major duties include providing information to grape growers on the latest and most efficient means of production viticulture and pest management through a variety of methods such as newsletters, media, consultations and commodity meetings.



## CALIFORNIA TABLE GRAPE INDUSTRY



Table grapes are of major economic importance, with the total farm gate crop value estimated at approximately \$1.0 billion dollars. About 99% of the nation's commercially grown table grapes are grown in California and of the 110,000 acres grown, 40% are grown in the Delano area. California is home to 550 table grape growers, according to industry estimates, so the average table grape production operation involves over 200 acres. However, it is common for large operations to farm over 1,000 acres. Since 2000, production has ranged from 739,100 (77.8 million, 19-pound boxes) to 911,050 tons (95.9 million, 19-pound boxes) of packed grapes and of those about 30% are exported each year.

## Applied Research:

### CULTURAL PRACTICES TO IMPROVE TABLE GRAPE QUALITY

Gibberellins are a class of naturally occurring plant hormones that are known primarily for controlling cell division and elongation. Early research on gibberellin for use on grapes revolutionized the table grape industry by significantly increasing the size of seedless grapes. The form of gibberellin manufactured for grape production is GA3, commonly called gibberellic acid (GA). The principal use of GA is to stimulate flower abscission and reduce berry set and to increase the size of seedless grapes. Treatment rates and timings are highly dependent on variety and vary depending on region and desired result. Following the release of new varieties, it is important that researchers work to establish initial treatment recommendations. These recommendations should be frequently tested and improved so that treatment programs provide consistent results under many different growing



conditions. Guidelines should assist growers to make the best possible treatment decisions, and more importantly avoid decisions that may damage fruit. In 2008, a project was created to examine the use of GA as a means to reduce berry set and to increase the size of ‘Scarlet Royal’ and ‘Sweet Scarlet’ table grapes.

**Extension of Information:**

Results of this project will be presented at industry meetings and distributed through newsletters, reports, trade magazines and individual consultations.

**INFLUENCE OF FUNGICIDES AND CLUSTER MANAGEMENT ON POSTHARVEST DECAY OF TABLEGRAPES**

*Botrytis cinerea*, the cause of gray mold, is the most important pathogen of stored table grapes. *Botrytis cinerea*, which also causes Botrytis bunch rot in the field, severely affects stored table grapes because it can infect the grapes in the field and then continue to grow in the berries during storage at 0°C (32°F). Growers attempt to manage the disease before harvest by integrating canopy (shoot thinning and basal leaf removal) and cluster management with fungicide treatments. After harvest, sulfur dioxide fumigation and cold temperatures manage the disease.



Since the late 1990s, a very troublesome rot of Redglobe grapes, called non-*Botrytis* slip-skin, has been observed in cold storage facilities in California. Symptoms include a cracking and dissolution of the skin followed by the development of sunken decayed areas. In extreme cases, nearly the entire berry is liquefied. The origin of the disorder is not completely understood, but it is associated with several yeasts and bacteria. Methods to manage this disorder have not been developed. We have initiated several trials in Kern County to evaluate the effectiveness of different fungicides to control postharvest rot on ‘Thompson Seedless’ and ‘Redglobe’ grapes and to determine the most effective timing and combinations of the most promising fungicides. In addition, we are also evaluating the use of potassium and calcium sprays and bunch trimming techniques to reduce bunch rot in the vineyard.

**Extension of information:**

Results from this project have been shared during individual consultations with the participating grower, chemical company representatives and other local growers. Furthermore, project results will be published in various newsletters and will be presented at the 2009 San Joaquin Valley Table Grape Seminar in February.

**Results and Impacts:**

With our best fungicide treatments, we were able to reduce postharvest decay by 50-85%. Initial work on potassium and calcium treatments were completed in 2008 and we have yet to draw any conclusions about their effects on postharvest decay and storage.

## **Support Team**

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**Peggy Schrader**  
Staff Research Associate II



**Beau Antongiovanni**  
Lab Assistant II



**Natalie Hernandez**  
Lab Assistant III



**Stephanie Rill**  
Staff Research Associate II



**Jed DuBose**  
Lab Assistant III



**Minerva Gonzalez**  
Lab Assistant III



## ***Support Team***

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**Karen Bayne**  
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**Doreen Pulido**  
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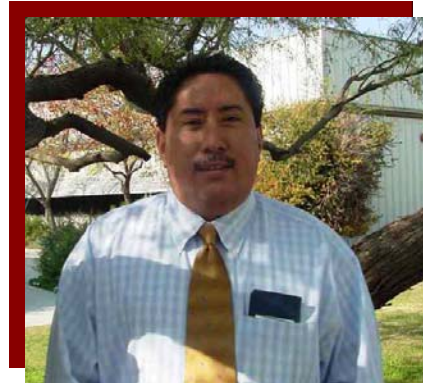
**Bea Ramirez**  
Nutritional Education Assistant  
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# Support Team

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**Terrance Stroman**  
4-H Program Representative II



**Rick Ramirez**  
Ag Field and Equipment Specialist



**Shawn DeSchutter**  
Office Services Coordinator



**CLERICAL STAFF**  
Left to right: **Marilyn Henderson, Patty Welty, Kimberlee Claffy, Sharon Crane**

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**UC COOPERATIVE EXTENSION  
KERN COUNTY FARM AND HOME ADVISORS**  
December 2008

Appointed: University of California  
**COUNTY DIRECTOR**  
**Darlene Liesch**

UC Personnel Academic (12)  
UC Personnel Non-Academic (15)  
Kern County Personnel (6)

