

UNIVERSITY OF CALIFORNIA COOPERATIVE EXTENSION

KERN COUNTY FARM AND HOME ADVISORS

2009 ANNUAL REPORT



UNIVERSITY OF CALIFORNIA
AGRICULTURE & NATURAL RESOURCES
COOPERATIVE EXTENSION KERN COUNTY



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Who We Are and What We Do

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

Darlene Liesch, County Director

“When things get tough, the tough get going”. In the case of the University of California Division of Agriculture and Natural Resources (where Cooperative Extension resides), when things got tough, the administrators, scientists and educators joined forces to create a Strategic Vision for 2025.

When the economy is in terrible condition, and budgets are continually reduced, it is very understandable to dwell on the situation’s negative aspects instead of considering the possibilities. By creating this strategic vision, the University looked ahead to the challenges that California might face. Local UCCE advisors used their expertise and provided input for this process.



What emerged were nine initiatives ranging from improving water quality, quantity and security and enhancing the health of Californians and our agricultural economy. They acknowledge the importance of increasing science literacy and strengthening positive youth development. Issues such as safe and secure food, sustaining natural ecosystems, and improving energy were all addressed.

It is now the charge of local UCCE advisors to examine the research and programs they are providing in Kern County and determine their relationship to the initiatives. And really, this is what Cooperative Extension has always done. We look at current local needs and future challenges. We take the strength and resources of the University and incorporate them into a local program that serves our clientele. This time, however, we have a “roadmap” that has good directional signs. In fact, it is more like a car GPS system where we can focus up close at where we are now and change the focus to see the bigger picture of where we are going.

The UCCE advisors of the Farm and Home Advisors Department look forward to continuing their work with agricultural and urban clientele and families and youth to secure a healthy and prosperous future.

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:

FEASIBILITY OF DEVELOPING A NEW ROOTSTOCK FOR NEW PISTACHIO CULTIVARS

University of California Cooperative Extension in Kern County has been a leader in producing new cultivars (i.e. cultivated variety) for the pistachio industry in California. These cultivars will play an important role in increasing the length of the harvest season so that more efficient use can be made of existing harvesting equipment and hulling facilities. During the course of the development of new cultivars through classical crop breeding and evaluation of existing cultivars in collections in California, it was noted that many of these potentially new cultivars tended to outgrow the disease-resistant rootstocks that pistachios are normally grafted on at a faster rate than occurred with Kerman, the industry standard cultivar. Differential growth rates between the scion (i.e. nut producing wood) and the rootstock can cause problems with attachment of the mechanical shaker to the tree trunk, and with time may shorten the useful life of the tree. In 2009, an initial breeding program was begun, to determine the feasibility of developing a rootstock that retained the necessary disease-resistance of the existing pistachio rootstocks and grow at a similar rate to that of the scion and thus produce a trunk of similar diameter. A project like this, if feasible, will take many years to complete, but well within the length of time that the pistachio industry is expected to remain a viable industry in California.

WHAT'S WRONG WITH FUKUMOTO NAVEL?

Kern County, and the southern San Joaquin Valley, is known for its production of early-maturing oranges. However, growers do not have many early-maturing varieties to choose from. In the early 1990s, a cultivar was released for commercial planting from the University of California Citrus Clonal Production Program (CCPP) that had an attractive round shape and a deep reddish-orange color. This orange, called the Fukumoto, was of Japanese origin and the fruit quickly developed a following among orange packers and the general public. Not long after commercial production began, growers of Fukumoto navels ran into trouble. Fukumoto navels demonstrated a high incidence of off-type fruit, suckering, stunted growth and other problems leading to severe decline of individual trees or the whole orchard. After several years of investigation, the problem appears to be related, not to disease, but to incompatibility of the Fukumoto scion with the rootstocks commonly used to produce Fukumoto trees. All navel oranges are propagated vegetatively, that is, a bud is taken from a known, disease-free tree and used to produce a new navel tree. We suspect that the original budwood source-trees for Fukumoto

navel in California may have been produced from unstable budwood. Unstable budwood is wood that tends to produce ‘chimeras’ or ‘sports’ which are mutations in the genetic code. To determine if this has occurred to the California Fukumoto budwood source, Fukumoto budwood from Spain, which appears free from the disorder, has been reintroduced to California through the CCPP program. Fukumoto trees produced from the Spanish budwood are now available to test experimentally by UC researchers against our California Fukumoto trees, to determine if a switch in Fukumoto source budwood is in order for successful California Fukumoto navel production.



Hybrid pistachio seeds on the tree after cross pollination during flowering

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. Commodity areas include cotton, corn and small grains. As Shafter Research and Extension Center Director, responsibilities include managing Center resources to support the Division's research and educational objectives.



Projects/Applied Research:

CORN SILAGE TRIALS

Corn hybrids were tested for silage yield. Seedling emergence and stand establishment were very good. There were no significant differences in plant population which averaged 38,000 plants per acre. Plots were sprayed for mites before harvest to protect surrounding plots. Silking and pollination occurred



during a period of moderately high air temperatures (between 90 and 100°). Yields were generally very good and ranged from 17 tons per acre to over 32 tons per acre. Degree day accumulation was 1351 DDs between planting and average silking date and an additional 945 DDs until harvest. Harvest was timed for physiological maturity. Degree day calculations used 86°F and 50°F for maximum and minimum temperatures.

Nearest neighbors statistical analysis was used to adjust for field variability. This process compares each plot to plots around it and how that area compares to the field average. An adjusted yield is calculated. Nearest neighbors can change the rank of varieties either up or down.

Results/Impacts:

Proper hybrid selection has a major impact on water use efficiency, nitrogen use efficiency and profitability. In comparing the lowest yielding hybrid to the highest, water use efficiency and nitrogen use efficiency were almost double and gross income is about \$350 per acre higher.

WEED CONTROL IN COTTON

Annual morningglory is a very difficult weed to control in cotton. An aggressive weed control program that includes hand hoeing is necessary to obtain acceptable control of this weed in areas of heavy infestation. With the change in the “One Quality Law” and the approval or pending approval of transgenic herbicide resistant cotton varieties, additional options are available to growers for weed control. Research has been conducted on herbicide resistant cotton in California since 1997. Bromoxynil must be applied to very small morningglory plants to be effective. Control is greatly reduced if plants are larger than the 2-leaf stage. Crop tolerance of the transgenic varieties to bromoxynil is excellent. Glyphosate will control larger annual morningglory plants but crop safety is an issue.



The objective of the study was to evaluate the weed control efficacy, cotton tolerance and economic viability of herbicides in conjunction with newly released transgenic cotton varieties.

The initial glyphosate application was broadcast applied on June 2 with all other treatments applied on June 22. The field was heavily and uniformly infested with annual morningglory. Shield spray treatments were applied with a three-nozzle arrangement under a ground-riding shield.

The bromoxynil treatments provided excellent control of annual morningglory smaller than 2-leaves. Weeds that were larger than 2-leaves were suppressed but not killed. The single glyphosate application did not provide season long control. Sequential glyphosate applications provided good season long control. No phytotoxic effects were observed for either bromoxynil or glyphosate treated plots.

Results/Impacts

Flumioxazin and gramoxone treatments are experimental treatments and are not labeled for cotton. Gramoxone severely stunted the cotton plants throughout the summer and never achieved full canopy closure. As a result, later emerging morningglory grew unencumbered. Flumioxazin broadcast also caused leaf damage and some plant stunting. Although these treatments provided good weed control, too much plant damage occurred. The shielded flumioxazin treatment gave good weed control with little plant damage as the spray was directed below the cotton leaves. Additional options are available for economic weed control.



Entomology and Pest Management

David Haviland, Farm Advisor

Program Description:

The Kern County Entomology Advisor is responsible for programs that develop and disseminate information on 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. They emphasize practices that minimize negative impacts to the environment by maximizing strategies that rely on cultural practices and biological control organisms. 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 coordinates research programs to generate pertinent information, such as for newly introduced exotic pests, on appropriate management strategies.

Applied Research - 2009 Highlights:

MANAGEMENT OF VINE MEALYBUG IN TABLE GRAPES

Vine mealybug continues to be 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. Since 2008, David has been involved in a variety of research projects looking at pest biology, its interactions with grape vines, and chemical and non-chemical control strategies. He continues to disseminate the results of these trials throughout Kern County and much of the rest of the state. The results of these projects have helped growers minimize mealybug damage, thus improving fruit quality, while at the same time reducing pesticide applications and increasing the adoption of reduced-risk control options. These include practices such as mating disruption and biological control that are more environmentally-friendly than traditional control strategies.



MANAGEMENT OF NEW PESTS OF BLUEBERRIES

Due to the very new nature of a California blueberry industry, growers have to learn as they go regarding blueberry pests. The Kern County Entomology Advisor has provided critical assistance in this area. Since 2005, David has been conducting research on citrus thrips, and in 2009 began working on a second pest, chafer grubs. For both pests, research has outlined the basic biology of the pests and how they interact with and damage the blueberry crop. In 2009,

special research emphasis was given to an environmentally safe practice of biological control involving predatory nematodes. Research showed that growers could purchase nematodes from insectaries, inject them through the water system to the soil underneath the blueberry plants, and that the nematodes would attack and kill the beetle larvae that were feeding on the plant roots. This has provided growers with a safe and effective control practice that doesn't require the use of pesticides and that can be practiced in both conventional and organic blueberry fields.

CITRUS LEAFMINER MANAGEMENT IN CITRUS NURSERIES



Citrus leafminer is a new pest of young citrus trees and has the potential to cause significant damage to Kern County's citrus nursery industry. One option for nurserymen is to repeatedly use insecticides to try to kill the worm pest. The Kern County Entomologist is working with a team of researchers that are looking at an alternative control strategy called mating disruption. Their work has shown that blanketing greenhouses with a synthetic version of the pheromone that leafminer use can cause an approximate 50% reduction in the amount of leafminer offspring by disrupting the ability of males and females to find each other and mate. Additional studies are underway to find ways to increase the efficacy of this practice and determine its value in outdoor nursery settings.

MANAGEMENT OF INSECT PESTS OF ALMONDS

Almonds have become one of the most significant crops grown in Kern County and is attacked by several insect pests. The Kern County Entomologist annually conducts or participates in multiple research projects that evaluate control strategies for spider mites, navel orangeworm, ants, and bugs. Several of these projects have helped identify options for growers regarding the use of insecticides and miticides, with special emphasis on newer products that are more targeted in their effects and pose less risk to fieldworkers and the environment. Other work has helped refine treatment thresholds to know when a grower does, and does not need to treat. The entomologist is also involved in efforts to teach growers how to use mating disruption, as was previously discussed for citrus leafminer, against navel orangeworm on large scale in commercial orchards.



Extension and Education Programs - 2009 Highlights:

EDUCATION ON SAFE AND EFFECTIVE PEST MANAGEMENT PRACTICES

During 2009 the Kern County Entomologist was actively involved in many extension efforts that focused on the education of members of the agricultural community. In 2009 he and his staff gave approximately 30 presentations on pest management practices, and wrote over 35 publications. He also serves on a variety of committees and other service organizations that are working to help prevent the movement of new pests into Kern County, that work to put together recommendations for new pests in case they arrive, and that help in the review and publication process of information from research projects that should be communicated to the farming community.

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, 2009

- Master Gardener I class with an enrollment of 99
- Master Gardener II class with an enrollment of 40



Topics discussed included:

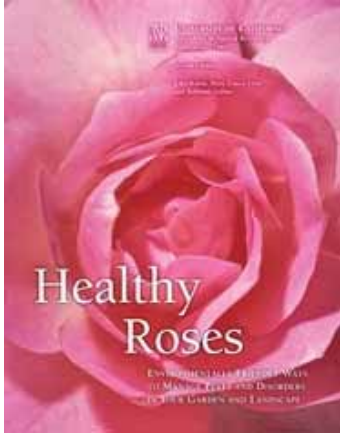
- Soil properties and their modification
- Plant selection and placement
- Tree planting and staking
- Pruning practices
- Small-scale fruit, citrus, and vegetable production
- Irrigation and water conservation
- Non-chemical pest management
- Plants and air quality



Visit to Wisley Garden, part of the 2009 horticulture study tour, with past Master Gardener students.

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.



ROSES

The UC publication on Healthy Roses was revised and updated, with a new section on virus diseases. The three UC Pest Notes on roses have also been revised and placed on-line.

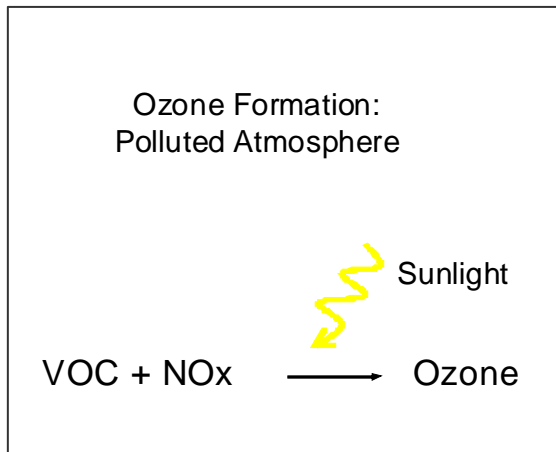
Impact:

Updated information for growing one of Kern County's major crops.

AIR QUALITY RESEARCH: Measurements of Biogenic Precursors to Ozone and Particulate Matter in the Central Valley—A Three-Year Project

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 moved to the field and began making flux measurements of VOC emissions, and ozone destruction, with an eddy covariance system. Ozone in the lower atmosphere is a pollutant with negative impacts on human health and crop growth.



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 clubs, both traditional and outreach, which serve more than one thousand members and four hundred volunteers. 4-H programs are available to both urban and rural youth.



Highlights:

SET – SCIENCE, ENGINEERING AND TECHNOLOGY

SET is a national 4-H initiative to expand the involvement of youth in science, engineering, and technology projects. SET activities and projects combine non-formal education with hands-on, inquiry-based learning in a positive youth development setting. One of the major goals of SET is to address the significant workforce shortage that is anticipated because of a lack of emphasis on science and math in U.S. schools in comparison with other nations.

Extension Methods:

Kern County 4-H currently offers a variety of youth programs and projects. Using these existing vehicles of youth development, we incorporated SET activities into a number of our county events as well as hosting a SET nature camp. At our Winter Camp we incorporated a bridge building activity and a rocket launch competition. At 4-H Field Day, we hosted an airplane design and flight contest. The conclusion of the SET year events was a nature camp held at the Wind Wolves Preserve that focused on the plant life, animal life, and geology of the San Emigdio Mountains.

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 members construct a bridge for the SET competition at Winter Camp.



4-H members learning about reptiles at SET Camp.

4-H MILITARY PARTNERSHIP

The U.S. military and 4-H has a long history of cooperation and joint activities. This year we were able to continue our support to Edwards Air Force Base (EAFB) by securing a grant which allowed us to provide additional training to their staff in implementing 4-H programs on base. Additionally, we were able to host several of their staff members and transport them to the State 4-H Leader Training in Asilomar, CA for further training. This year we also worked closely with China Lake Naval Air Warfare Station (NAWS) to plan and implement summer 4-H projects at their base. We provided training for their staff regarding 4-H administration and projects so they could get their program underway.

Extension Methods:

The staff from both facilities utilized the training and curriculum they received to implement summer programs in the areas of consumer and family sciences, health, communication and expressive arts, and plant science.

Results/Impacts:

The staff of EAFB increased their existing 4-H program and the staff of China Lake NAWS planned and initiated their program. Both sites were able to offer strong youth development programs to the military dependents at each facility. Additionally, the youth from EAFB expanded their participation by attending traditional 4-H programs offered within the county.

4-H OUTREACH PROGRAM

Having a youth participate in an organized 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 youth 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.

Results/Impacts:

Several hundred youth have participated in the program with the vast majority coming from lower income families. The highlights of this year's program for the participants were a summer camp, a winter camp, and a soap box derby. At the summer camp these urban youth participated in a traditional resident camp setting with all the amenities such as horse back riding, archery, and crafts. At winter camp, the youth from the outreach program participated in activities such as sledding, skis, and science projects. The soap box derby was the climax of the program. Youth who had helped construct soap box derby cars raced them in a contest at a youth festival set up especially for them.



4-H members race to the finish line.

Irrigation and Agronomy

Blake Sanden, Farm Advisor

General Program Summary

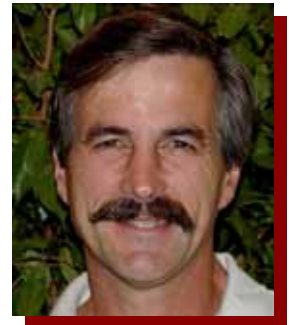
IRRIGATION & SOILS

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.



Educational & Professional Outreach For 2009

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

Impacts:

- 6 Kern County meetings/workshops
- 18 other county meetings
- 20 professional/university meetings
- 4 newsletters, 4 popular press article
- 95 farm calls and office consultations
- 12 research projects
- 1834 people served

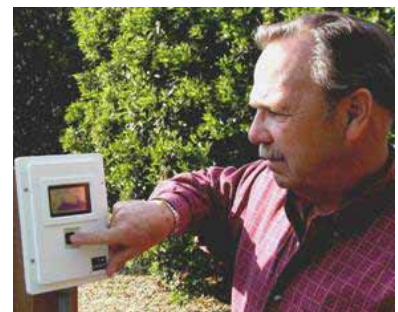
IRRIGATION MANAGEMENT, MONITORING & KERN EFFICIENCY (2009 update)

Situation: The cost of supplemental water on the Westside of the SJV for 2009 reached \$300 to \$500/ac-ft due to reduced supply from a third drought year and legal decisions impacting Delta exports.

Methods: Eight years of field evaluation and irrigation scheduling demonstrations have proven the reliability of a relatively inexpensive sensor/logger system to monitor soil moisture at the grower level. We assisted growers during installation of this system and provided recommended irrigation schedules and troubleshooting visits during the season. Results and problems are discussed at annual Kern Irrigation Workshops.

Impacts:

- 12,600 acres, 143 fields, 35 different growers
- 14 different crops (54 almond fields), 9 different irrigation system types
- Average water use efficiency: 95%
- Testimony and data provided to CA Dept of Water Resources for assessing field irrigation efficiency in 2009 CA Water Plan. Including crop water use data to improve state water analysis (SWAN) modeling.

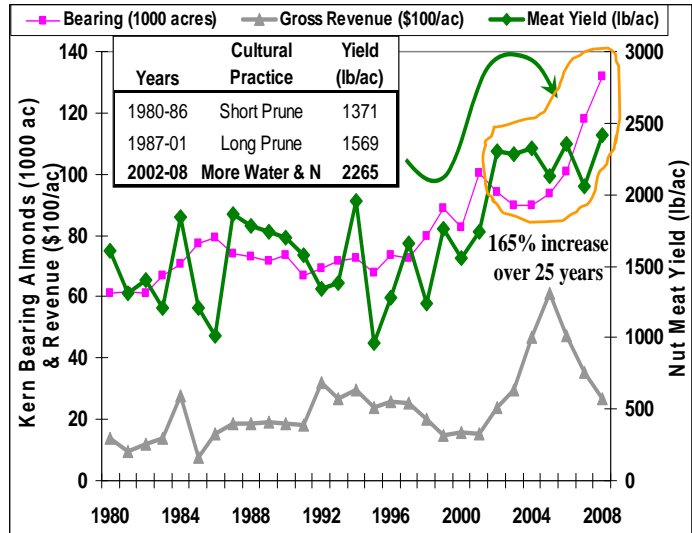


WATER USE & SALINITY IN ALMONDS & PISTACHIOS

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 urban water conservation alone. But over the last 20 years, groundwater levels across the state have declined significantly, indicating insufficient surface water is delivered for irrigation and groundwater recharge. This means basin water use efficiency is near 100%. In western and NW Kern County, declining groundwater levels have been often



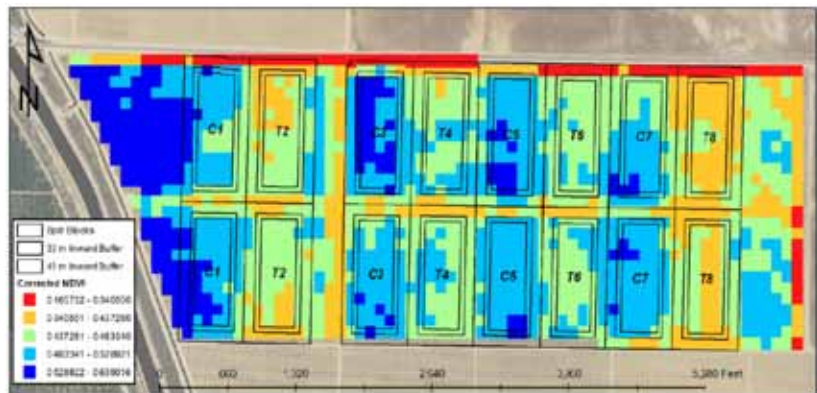
declining well water quality and lack of winter rainfall leaching has caused salts to accumulate and reduce yields in many orchards. Chloride burn is common. **Satellite imagery** can help set the bounds of severely affected areas for efficient leaching and soil amendments. A white film of kaolin clay did not increase quality or reduce plant stress in deficit irrigated pistachios. **Elevated salinity decreases crop water use and increases leaf burn in pistachios, but can still provide economic yields where almonds would not.**



accompanied by increasing salinity. This is trouble for salt sensitive crops like almonds. Ironically, research by Kern UCCE and others over the last 10 years has shown that southern San Joaquin Valley almonds need as much water as alfalfa to make top yields. Kern almond yields have increased 165% in the last 25 years due to a better understanding of irrigation and fertility. Pistachios provide some alternative as Kern County trials have proven they are as salt tolerant as cotton.

Methods: Using meteorological instruments, satellite/aerial imagery and ground-based soil water data continue fertility/irrigation trials in almonds and salinity/irrigation/plant stress trials in pistachios. Conduct salinity management workshops and office/farm call consultation for salinity and irrigation problems.

Impacts: Excellent irrigation efficiency in most Kern almonds, coupled with the potential high water use,



Corrected NDVI on June 18, 2009 after application of kaolin clay.

Nutrition, Family and Consumer Science

Margaret Johns, Advisor

MAKING EVERY DOLLAR COUNT

A new online program, Making Every Dollar Count (MEDC), www.makeeverydollarcourt.ucr.edu has been developed to provide families with the basics of smart money management and the information they need to make good financial choices. Eight easy-to-understand lessons have been designed with limited-resource, low-literacy adults in mind. Available in English and Spanish, the printed curriculum includes simple-to-use lessons with a leader's guide, PowerPoint visuals, activities, and handouts needed to help families and individuals take control of their daily finances. The program is also available as an online self-paced English/Spanish tutorial that can be read or listened to at times and locations convenient for learners. The web version is complete with interactive activities for participants to use as they complete the lessons.



The MEDC lessons include Setting Goals; Making Choices; Stretch Your Dollars with Personal and Community Resources; Budgeting; Paying Bills on Time Saves Money; When You Can't Pay Cash; Saving Money on Food; and Food Advertising. An introductory video introduces the MEDC curriculum and web site to capture the interest of the target audience.

The primary target for this curriculum is limited-resource, low-literacy adults, especially those participating in Federally-funded nutrition education programs, Expanded Food and Nutrition Education Program (EFNEP) and the Food Stamp Nutrition Education Program (FSNEP). Food Stamp recipients or other limited-resource adults often deplete financial resources for food prior to receiving the next paycheck or Food Stamps benefits. By empowering individuals and families to take control of their finances and improve food shopping skills, self sufficiency is increased and they move towards financial stability.

Extension Methods:

Kern County has been very involved with this project. I am a major contributor to the team that revised the original material to the lower literacy format and converted the materials to the self-paced tutorial on the web. The pre-pilot test was conducted at the Bakersfield Adult School where three separate groups were taught Setting Goals, Making Choices and Stretch Your Dollars. The first group served as the control group and received the traditional classroom instruction only ($n=58$). The second group was a combination of classroom instruction and computer instruction ($n=66$). The third group received computer instruction only ($n=45$). Participants in the computer only group were not given any directions and completed the lessons at their own pace. All participants in this study completed the family demographic form, pre- and post-test for knowledge, and a retrospective behavior checklist.

The complete curriculum has been tested with Food Stamp eligible individuals in both its printed and web-based formats in six counties, including Kern County. The first group served as the control group and received the traditional classroom instruction only ($n=67$). The second group was a combination of classroom instruction and computer instruction ($n=37$). The third group received computer instruction only ($n=36$).

Impact:

In the pre-pilot study there were significant increases in knowledge and a significant number indicated they had learned a lot. Those that were taught with computers only or with combined computer/classroom indicated they would prefer to learn the lessons using the computer only. Overall, all participants indicated that they were comfortable using the computer. Thus, it appears that using the computer will be an appropriate methodology to teach resource management to limited-resource audiences.

All eight lessons in the completed curriculum were pilot-tested in six counties over a 10-week period of time. As a follow-up evaluation at the end of the program, a group of retrospective questions were asked to each of the participants. The participants were asked to score their level of perceived knowledge before and after the program using a scale of 1 to 5 with 1 being low and 5 being high. The respondents were asked about setting personal goals, understanding values, knowing the difference



Participant using the self-paced online tutorial.

between a need and a want, how to make choices, knowing personal skills and resources, knowing community resources, using resources to make your money go further, knowing easy ways to save money on food, knowing simple healthy meals to make at home, and understanding food ads. There was a significant perceived increase ($p=.001$) in the participants' knowledge from before the program to after the program for all items with one exception. For knowing community resources, the classroom group did not have a significant increase. It is interesting to note that while knowledge gain regarding community resources as reflected on the pre/post test was not significant, the participants perceived that they had gained knowledge about community resources

Participants at the end of the program were also asked a series of questions that reflected actions they had taken or planned to take because of MEDC. A significant number of participants answered they had taken or planned to take the following actions:

- Written a personal goal
- Used choice-making process
- Identified community resources
- Checked to see if eligible for EITC
- Used easy ways to save on food
- Determined if using a coupon is better than store brand (over 50% of all groups had completed this task)



Welcome screen of the online version.

Participants overwhelmingly stated the program was worth their time. There are very few programs designed for low-income, low-literacy participants. The pilot study proves this program is assisting in moving low-income families towards self sufficiency.

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.



AGRICULTURE SUSTAINABILITY STUDIES

Carrots and potatoes are significant crops for Kern County and are the two largest vegetable crops grown here. As root crops they depend on fumigants to rid the soil of nematodes and other soil borne plant pathogens. However, due to volatile organic compound emissions (VOC), worker and public safety, environmental issues associated with fumigants there has been increasing restrictions on the use of fumigants. Less acreage is being treated by soil fumigants to rid the soil of nematodes and other soil born pathogens. Suitable alternative methods of pest management are greatly needed by the vegetable industry in Kern County. As a result a significant part of my research has been spent on research on alternative methods of nematode control and control of other soil born plant pathogens that are more sustainable and environmentally acceptable.

NEMATODE RESEARCH:

Nematode damage continues to be a significant problem for not only vegetable production but most all commodities grown here. Nematodes are microscopic aquatic worm-like animals that live mainly in the soil. Although there are numerous types of plant parasitic nematodes, the one of most concern to Kern County growers is Root Knot Nematode (RKN).



Root Knot Nematodes on carrots

Root Knot Nematodes feed and reproduce on the roots and tubers of plants. This activity removes nutrients from the plants, reducing vigor and yield. Also, the injury they cause allows entryway for other pathogens to enter the plant which can cause more damage to the crops. Root Knot Nematodes also distort the root and tubers with large galls or “knots” that make root crops such as carrots and potatoes unmarketable.

For the second year we have evaluated novel biological and botanical products that are currently available to growers but have little practical field research. We applied these products on a carrot field that was heavily infested with RKN. We had a large presence of growers and pest control consultants at a field day we held there to show them the potential of some of these products. Many of them are now planning to look at these products in their own fields next season. Another trial with these products is being conducted at the UC Shafter Research and Extension Center. This study has generated a lot of interest by others throughout California who also see the need for alternative methods of nematode control.

GREEN MANURE COVER CROPS

Many plant diseases are soil born. Most soil born diseases are inheritably difficult to control because getting a chemical product to the site that it is need and be effective is challenging. General biocide fumigants like metam sodium are therefore often used by growers to control soil born pathogens. But as stated earlier, the use of fumigants present their own problems.

One method of controlling soil born disease problems is by increasing soil health. Increasing soil health can be achieved by increasing the diversity and number of soil microorganisms in the soil. High microbial diversity and microbial activity in the soil buffers the activity and aggressiveness of plant pathogens in the soil. This can be achieved by adding carbon to the soil which is the energy source for the microbes in the soil. The easiest and most practical way to add carbon to the soil is by growing a cover crop and tilling it under while the cover crop is still green, also known as a green manure.



Incorporating green manure cover crop in Tehachapi

We demonstrated that concept at a grower's field in Tehachapi which was having problems with powdery scab of potato. The field was too close to homes to be treated with a soil fumigant but also the grower himself did not like the use of soil fumigants in general. He asked for our assistance to find out if using cover crops could suppress this soil born problem of potatoes. We planted mustards and a legume mix in strips along with the standard practice of fallow soil in strips. After three months of



Powdery scab on potato

cover crop growth we incorporated the cover crops into the soil as a green manure. The grower followed through by planting potatoes into the treated area and we then evaluated the resulting potato crop for powdery scab. Both the mustard and legume mix green manure cover crops significantly reduced the amount of powdery scab as compared to the fallow controls. The grower is now using this method of control on all of his fields that have a history of powdery scab.

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:

INFLUENCE OF CLUSTER-DIRECTED APPLICATIONS OF POTASSIUM SALTS AND OTHER COMPOUNDS BEFORE HARVEST ON QUALITY AND POSTHARVEST DECAY OF TABLE GRAPES

Little research to establish the effects of supplemental potassium on grape berry quality has been done because it has long been known that potassium must be minimized on wine grapes because it harms wine quality. In table grape production, however, potassium sprays may be an important tool to enhance fruit quality and facilitate early harvest. In 2007 several preliminary experiments were conducted where repeated applications of fruit-directed mineral nutrient (potassium and calcium) sprays were applied alone or in combinations to 'Redglobe' or 'Crimson Seedless' grapes. We found that potassium sorbate sprays significantly improved firmness and sugar content of 'Redglobe' berries treated 5 times between berry set and harvest. Effects were evident at harvest and after storage for up to 10 weeks.

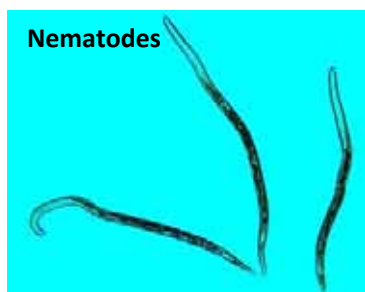
Results and Impacts:

In 2009, a large number of compounds were evaluated in field trials and prior results with potassium sorbate were confirmed. In two tests, fruit-directed potassium sprays increased berry firmness, sugar content and color intensity, with a minor reduction in berry size. Potassium-treated grapes were of harvestable color and maturity approximately 2 to 3 weeks before those untreated.

Extension of information:

This has been a very popular and successful project among regional table grape growers. Information developed from this project has been delivered through talks at the San Joaquin Valley Table Grape Seminar in February and also during a special field meeting highlighting the project in August. I have also answered numerous emails and phone calls regarding commercialization of potassium sorbate treatments and estimate that more than 1,000 acres were treated in 2009. In addition, a new fertilizer product was formulated based on our project's results.

EVALUATION OF ROOTSTOCKS FOR TABLE GRAPE PRODUCTION



Roots of grapevines host numerous soil pests with phylloxera and nematodes being the most damaging to production viticulture. The common management practice to overcome the damaging effects of nematodes is to use resistant rootstocks. However once a research program develops new resistant rootstocks, they must be evaluated for horticultural characteristics they impart to the variety in addition to field pest resistance.

Results and Impacts:

In 2008, we planted two new rootstock trials utilizing newly released USDA table grape cultivars, 'Scarlet Royal' and 'Autumn King'. These will be the very first replicated rootstock trials utilizing these cultivars and information developed from these trials will be useful to make future recommendations on rootstock selection in the San Joaquin Valley. No other source of information exists on the performance of these cultivars grafted to commonly used and experimental rootstocks. These new trials will be evaluated from 2010-2018.



Organizing green-growing potted vines grafted to experimental rootstocks prior to planting in a field trial.

Extension of information:

This project has already provided essential information to grape-growers and the nursery industry on horticultural characteristics, such as yield, fruit quality, vine vigor and nutrition status of field grown varieties grafted to new rootstocks developed for broad and durable resistance to nematodes and to common rootstocks currently used. I continue to work with growers on an individual basis to select the appropriate rootstocks based on variety, soil-pest problems, soil type and vineyard location for new vineyard plantings. The information developed in this project offers growers more choices in rootstock selections for nematode and phylloxera resistance.

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KERN COUNTY FARM AND HOME ADVISORS**
December 2009

Appointed: University of California
COUNTY DIRECTOR
Darlene Liesch

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

