University of California Cooperative Extension
Kern County Farm and Home Advisors
2011 Annual Report

UC CE

University of California
Agriculture & Natural Resources
Cooperative Extension Kern County

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 currently participate in 4-H programs and over 400 adult volunteer leaders serve as mentors and teachers to these youth.
- **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 healthy 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.
- 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.

UC Cooperative Extension
Kern County Farm and Home Advisors

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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:

PISTACHIO BREEDING AND EVALUATION CONTINUES

University of California Cooperative Extension in Kern County has been a leader in producing new cultivars (i.e. cultivated varieties) for the pistachio industry in California. This is an appropriate activity for this county, which, because of its climate, soils and growers, leads the nation in the production of pistachio nuts.

Maintaining market competiveness for any crop in the global marketplace is difficult as production costs continue to increase. Often, the introduction of development of new cultivars, through better climate adaption, resistance to diseases, early or later maturity, increased productivity or navel fruit or nut quality characteristics can maintain the economic viability of a crop to California growers and in turn to the San Joaquin Valley economy as a whole.

In the spring of 2011, a large-scale pistachio breeding effort was conducted in Kern County utilizing a large array of pistachio germplasm that now exist in Kern County thanks in large part to funding by the California Pistachio Research Board (i.e. the grower commodity group for pistachio) and the generous support of local growers. Pistachio trees are dioecious, which means male and female flowers grow on different trees. Thus an individual 'cross' consists of placing the pollen from the flower of a male tree onto the stigma of the flower on a female tree. Dozens of crosses were made between pistachio selections and cultivars having known individual desirable traits with the objective of combining these traits into superior cultivars. In August, over 5000 seeds from these crosses were collected, which is the first step in the long process toward new cultivars.

Pollination bags used to ensure that only the desired pollen fertilizes the female flower. Different colors represent pollen from a different male tree.

Evaluation of advanced selections that are further along in the process toward becoming new cultivars continued in 2011. Three University of California cultivars, 'Golden Hills' and 'Lost Hills' (female trees) and the 'Randy' male tree, which were released to the pistachio industry in 2005 are increasing in acreage, and continue to show promise for the industry. These cultivars mature earlier in the season than 'Kerman', the industry standard, which spreads out the harvest season, reducing peak demand for labor, harvesting equipment and nut processing capacity.

'FUKUMOTO' NAVEL IMPROVEMENT

Kern County is known for the production of early-maturing navels. In the late 1980s, the Fukumoto navel was introduced to the California citrus industry. This navel originally came from Japan. Fukumoto produces an early maturing, large navel with a deep orange-red color and round shape. These are characteristics that a number of the other commonly used early-maturing varieties cannot claim. However, the existing budline of Fukumoto navel, the budline from which all Fukumoto navel trees in the California descend, appears to have a problem with compatibility with the commonly used rootstocks used to produce Fukumoto trees in California. All citrus trees in California are composed of the fruit producing portion of the tree (called the scion), which is grafted onto a rootstock (which is often a different citrus species or a different genus). The rootstock will have resistance to root rot, or have some other characteristic that the scion does not have. In most orchards, many Fukumoto trees demonstrate stunted growth, with the proliferation of many shoots originated from just below and above the graft union. These trees decline and the problem may result in the death of the tree. Testing suggests that the problem is not a disease and is not caused by improper irrigation or soil alkalinity.

Growers in Spain, in a citrus growing area with a similar climate to that of California, apparently are not having the problem with Fukumoto that we are having here. A number of years ago, and with the leadership and expertise of citrus researchers at UC Riverside, budwood from the Spanish line of Fukumoto, was brought to California, processed through the California Citrus Clonal Protection Program to remove any potential graft-transmissible disease organisms, and used to produce new trees.

Dead Fukumoto tree showing overgrowth of the rootstock at the graft union and sudden death of the tree with fruit still attached.

These Spanish-line trees are now being compared to the growth of trees of the same age produced from buds from the existing California line of Fukumoto budwood in a trial in Kern County. The trees in this trial will be starting their third year of growth in 2012, and differences, if any, should begin to become apparent this year. If the Spanish Fukumoto line does not have the problems that we currently see with this cultivar, it will likely, eventually, become the new California line as well.

COTTON, CORN AND SMALL GRAINS

Brian Marsh, Farm Advisor

Program Description:

The Kern County Farm Advisor is responsible for 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. Other areas of research are chemical weed control and nitrogen fertility across multiple crops.

Projects/Applied Research:

REMOTE SENSING OF WHEAT TO DETERMINE NITROGEN FERTILIZER RECOMMENDATIONS

Kern County produced 1.6 million tons of wheat silage valued at 39.2 million dollars on 75,000 acres and 1.5 million tons of grain valued at 46 million dollars on 62,500 acres in 2010. Nitrogen fertilizer is the most used and often the most mismanaged nutrient input. Nitrogen management has tremendous implications on crop productivity, quality and environmental stewardship. Soil and in-season plant tissue testing for nitrogen status are a time consuming and expensive process. Real time sensing of plant nitrogen status can be a useful tool in managing nitrogen inputs.

The difference in N content between plot A and B is visual with the naked eye. The N content difference between plot B and C is not. However, remote sensing can establish a difference and recommend the appropriate nitrogen fertilizer rate.

The objectives of this project were to assess the reliability of remotely sensed non-destructive plant nitrogen measurements compared to wet chemistry data from sampled plant tissue, develop in-season nitrogen recommendations based on remotely sensed data for improved nitrogen use efficiency and assess the potential for determining yield and quality from remotely sensed data.

Very good correlations were observed between early-season remotely sensed crop nitrogen status and nitrogen concentrations and subsequent fertilizer recommendations.

SPAD meter measurements should be made mid leaf on the upper most fully exposed leaf for greatest consistency and accuracy. CM 1000 measurements made early in the season should be made with the instrument at a 45 degree angle from the crop. Too much bare soil can be included in the measurements made at a 90 degree angle early in the season thereby making those measurements less reliable. The 90 degree angle CM 1000 late-season measurements were more precise than the 45 degree angle measurements.

Early season nitrogen fertilizer recommendation is as follows:

> Apply the expected full nitrogen fertilizer rate on a reference area at least three weeks prior to sampling with actively growing plants. The reference area should be representative of the field and can be several small areas throughout the field or a strip through the field. At Feekes 5 to 6, compare the readings from the reference areas to readings from the remainder of the field. Because individual plants vary, at least 30 readings should be made throughout the field and reference area. The difference between the averages of the readings will give an indication of the need for additional nitrogen fertilizer.
>
> The nitrogen rate calculation using the SPAD meter is:
>
> $$N = 35 + 12D$$

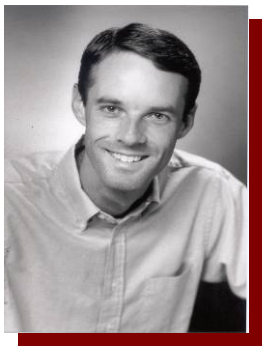
N = Recommended Nitrogen Rate in lbs N/A
D = Difference in SPAD meter reading between measured crop and reference area

DEVELOPMENT OF THE KERN RESEARCH FARM

Infrastructure improvements have included the construction of a 2250 square foot storage building and improvements and additions to the irrigation systems. The addition of permanent sprinkler irrigation equipment has greatly enhanced our ability to conduct research on vegetable crops. Underground mainlines for sprinkler irrigation have been extended to all the fields. Improvements have been made to the drip irrigation system. Equipment has been installed to apply fertilizer or pesticides through the irrigation systems.

ENTOMOLOGY AND PEST MANAGEMENT

David Haviland, Farm Advisor



Program Description:

The Kern County Entomology Advisor is responsible for the development and dissemination of pest management programs for insects and other arthropods that are found in Kern County farms, homes, and landscapes. He has the responsibility of being knowledgeable on issues related to insect pest management on all commodities grown in Kern County and 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.

The Kern County entomologist focuses on integrated pest management programs 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.

Applied Research - 2011 Highlights:

DEVELOPMENT OF MANAGEMENT PROGRAMS FOR SPOTTED WING DROSOPHILA IN EXPORT CHERRIES

During February 2010 a new invasive pest of cherries called spotted wing drosophila was found in Kern County. This pest is similar to the fruit flies commonly found on overripe fruit, except that they have capability of attacking fruit in the field before it is ripe. Cherry growers battling this pest have no choice but to use insecticides within the last few weeks of harvest to control this pest such that they can maintain a viable cherry product that can be exported throughout the world.

Throughout the past two years we have done significant amounts of research on spotted wing drosophila biology. This work has helped define the host range of this pest in Kern County, its movement back and forth among crops, how it overwinters, periods of time that it can attack fruit, and seasonal changes in pest density.

During 2012 we also took the leading role on a joint research program between California, Oregon, Washington and British Colombia regarding pesticide residues on cherry fruit. Current, international laws allow all countries to determine the amount of pesticide residues that are allowed on fruit in their countries. This is a problem because an insecticide that is used in a safe and approved manner here in the United States can cause fruit to be rejected from export markets that have not yet

established policies on acceptable levels of that insecticide, or that have set levels that are lower than what is acceptable domestically. We addressed this issue by doing field research during the spring of 2011 on the degradation rates of six different insecticides commonly used for spotted wing drosophila. The results of this project were used to establish management programs that could be effective without causing fruit rejection. These programs were used successfully in Oregon and Washington during the second half of 2011 and are now in place for the benefit of Kern County growers during the spring of 2012.

MANAGEMENT OF OTHER TREE AND VINE PESTS

Advisor Haviland has developed a robust research program for pests of nuts and grapes. During 2011 he focused on the development of improved methods for controlling vine mealybug in grapes, navel orangeworm in almonds and pistachios, and spider mites in almonds. In each case this research program focuses on identifying weaknesses in pest biology or behavior that can be exploited through one or more pest management practices.

SABBATICAL LEAVE TO LA SERENA, CHILE

Kern County entomologist David Haviland was awarded the opportunity to take a 9-month sabbatical leave to La Serena, Chile beginning in July 2011. As part of this sabbatical leave he is currently living in an area of Chile recognized for the production of similar fruits and vegetables to those that are produced in Kern County. Approximately half of David's time in Chile is being spent writing peer-reviewed journal articles for work that has been completed over the past six years in Kern County. The remainder of his time is being spent to improve his capacity as an agricultural entomologist and to provide assistance for efforts in Chile to develop a system for information transfer to farmers (similar to what is done in Kern County). During the time he is in Chile David has still maintained an active research and extension program in Kern County that is being led by his Staff Research Associate Stephanie Rill. Stephanie has a M.S. degree in entomology and has been working as an entomologist in Kern County for approximately five years.

Extension and Education Programs - 2011 Highlights:

EDUCATION ON SAFE AND EFFECTIVE PEST MANAGEMENT PRACTICES

Each year the Kern County Entomologist is actively involved in extension work that ensures that growers and pest control advisors in Kern County receive the latest information on the most affordable, safest, effective methods for pest control in a variety of local crops. In 2011 Advisor Haviland gave approximately 30 presentations, authored approximately 35 publications, and attended a variety of local events helping children, teachers, and other community members learn about pest management issues facing Kern County.

ENVIRONMENTAL HORTICULTURE/ ENVIRONMENTAL SCIENCE

John Karlik, Advisor

HORTICULTURE FOR LANDSCAPE AND GARDEN 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 classes for horticulture for landscapes, gardens, and orchards were held during fall, 2011, and were complemented by our annual pruning demonstrations held in December.

- Horticulture I class with an enrollment of 48
- Horticulture III class with an enrollment of 28

Topics discussed included:

- Soil properties and their modification
- Plant selection and placement
- Tree planting and staking
- Pruning of shade trees and fruit trees
- Small-scale fruit, citrus, and vegetable production
- Irrigation and water conservation
- Non-chemical pest management
- Plant selection

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.

Kern residents attend a pruning demonstration taught by John Karlik and Mario Viveros.

AGRICULTURAL CROPS AND AIR QUALITY

We have been engaged in two three-year projects to identify and measure trace gas emissions (more specifically volatile organic compounds) from agricultural crops and their contribution to the atmosphere. Alongside, we have been measuring removal of ozone by citrus trees. This work was partly conducted in greenhouses at UC Berkeley, and also at a field site in Tulare County about three miles west of the UC Research and Extension Center at Lindcove. We found that crops emit low amounts of isoprene, the dominant volatile organic compound emitted by plants. We also found that ozone was removed by citrus trees through three processes: stomatal uptake, surface reaction, and gas-phase chemical reactions. This work helps us better understand the role agricultural crops play in regional air quality.

The enclosure apparatus at UC Berkeley.

Allen Goldstein, professor at UC Berkeley, and Silvano Fares, a post-doctoral researcher, working on data at the citrus site.

Silvano Fares, post-doctoral researcher, checks instruments on the tower before it is elevated.

Tower in citrus orchard with measurement instruments and inlet lines leading to analytical equipment.

4-H Youth Development

John Borba, Advisor and Interim County Director

Program Description:

4-H is a nationally recognized positive 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 enables youth to develop into productive citizens and leaders by learning through hands-on, research-based projects with adult mentors. 4-H is open to youth 5 through 19 years of age. Kern County hosts nearly forty clubs, both traditional and outreach, which serve more than one thousand members and hundreds of volunteers. 4-H programs are available to both urban and rural youth.

Highlights:

PROMOTING BIO-SECURITY IN 4-H

Livestock exhibitors often transport their animals across county and state lines to get them to fairs and expositions. These animals can come into contact with numerous health hazards along the way. Food safety and animal identification have become major issues. The practices that individuals follow in transporting and housing livestock can affect a major food production source.

Extension Methods:

Kern County 4-H staff has been involved with a project with the Veterinary Medicine Science Department at UC Davis to create an educational program for volunteer leaders and youth regarding common practices of handling, housing, and transporting livestock. Data was collected by Kern County 4-H staff that allowed the research team to attain observations from fairs in the southern San Joaquin County. A pilot program was developed for teaching 4-H volunteer leaders and youth about bio-security as it relates to their animal projects.

4-H member prepares to transport her animal from the exhibit arena.

Results/Impacts:

Kern County was selected as a pilot site for the new material. A team of 4-H volunteers were recruited and trained on the material. They are currently implementing the lessons with the youth in their clubs and will be providing their input regarding what worked and what needs improvement for the development of future lessons.

PROMOTING SCIENCE, ENGINEERING, AND TECHNOLOGY (SET)

4-H SET is a national movement to expand the involvement of youth in science, engineering, and technology projects. SET activities 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 has been involved in SET since its inception in 2008. Utilizing our venues of clubs, camps, and outreach projects, we incorporate SET activities into a number of existing 4-H programs. This year our major program was a SET camp hosted at the Windwolves Nature Preserve. The youth and adults involved participated in a number of SET activities including Project Skulls and Boat Building.

Results/Impacts:

Evaluations of those involved in the program showed that they improved their knowledge about nature or the outdoors. Additionally, because of 4-H involvement and reputation for SET activities, we are in the process of implementing SET programs into two after-school programs in Kern County.

4-H member and leader participate in the wildlife identification project at SET camp.

4-H OUTREACH PROGRAM

Having a child participate in an organized activity such as sports leagues, recreation programs, etc. is not an option for all 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 in under-represented communities.

Extension Methods:

A 4-H Program Representative implements the program by visiting apartment complexes, community centers, and housing authorities and engaging the youth in hands-on learning projects that teach as well as entertain.

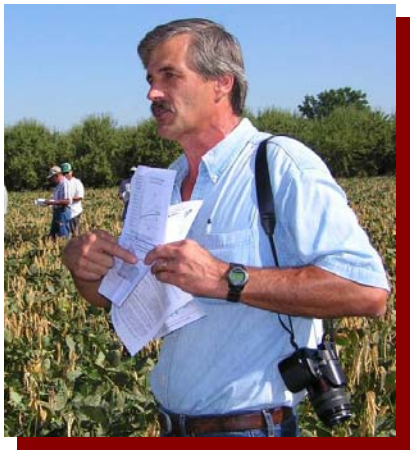
Results/Impacts:

Hundreds of youth participated in the program with the majority coming from low-income families. Their activities included community service projects, business projects and a Science, Engineering and Technology project culminating with a model rocket launch. The highlights of this year's program for the participants were a summer camp and a community family day with a soap box derby race. At the summer camp these urban youth participated in a traditional resident camp setting with all the amenities such as archery, crafts, and horse back riding. The community family day allowed the youth and their families in the program the opportunity to participate in group games and contests. Youth who helped construct soap box derby cars raced them at Bakersfield College. Most importantly, teen leaders from the program had the opportunity to attend the 4-H Leadership Conference of Regional Teens (LCORT) at Wonder Valley. At the conference these teen leaders participated in group tasks that promoted leadership and public speaking.

Receiving a safety check at the 4-H Soap Box Derby Race.

IRRIGATION AND AGRONOMY

Blake Sanden, Farm Advisor



General Program Summary:

IRRIGATION & SOILS: Major Program Focus

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 for production of alfalfa, dry beans, sugar beets and safflower through grower consultations and field trials.

IRRIGATION MANAGEMENT, MONITORING & KERN EFFICIENCY (2011 update)

Situation: Water allocations to SJV growers finally returned to 100% in 2011 thanks to a wet winter. But average water costs for Kern growers is still near $100/ac-ft with Westside supplemental canal water costing more than $300/ac-ft. Ensuring optimal water use efficiency is key to grower survival and proving beneficial use.

Methods: Nine years of UCCE Kern County field evaluation and irrigation scheduling demonstrations using various soil moisture monitoring techniques has proven dependable and cost effective for many permanent and vegetable crops. We helped growers install and understand the use of monitoring technology. 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%
- Confidence and understanding of these systems through UCCE Kern demonstrations has created markets for other companies and grower use of this technology on an estimated 100,000 acres in Kern County.

Extension Outreach For 2011

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

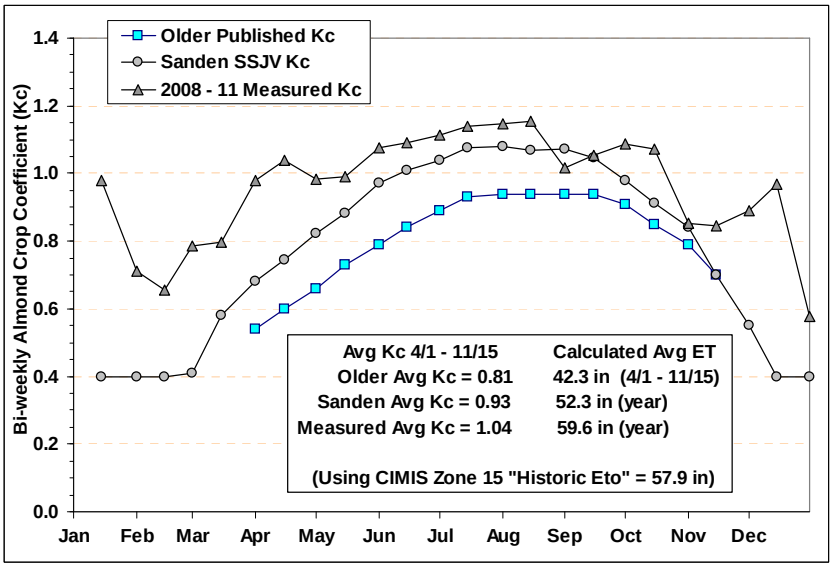
Impacts:

- 2 Kern County meetings/workshops
- 13 other county meetings
- 22 professional/university meetings
- 3 newsletters, 4 popular press articles
- 95 farm calls and office consultations
- 11 research projects
- 2000 people served

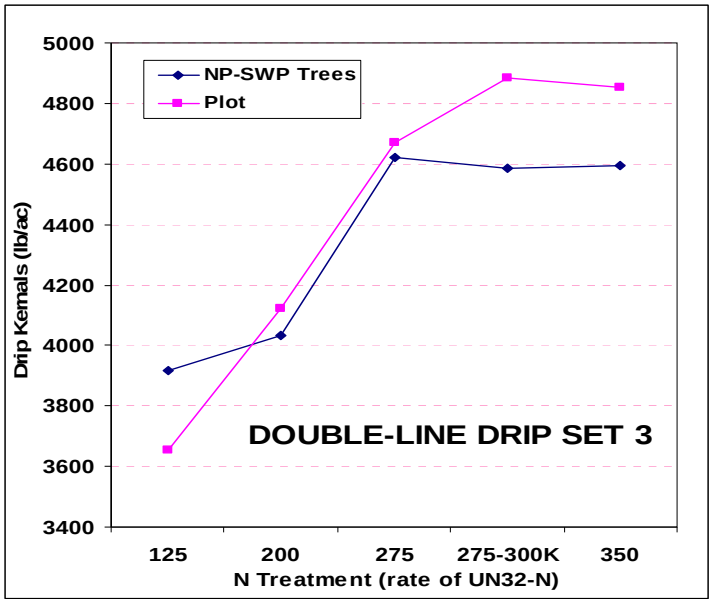
IMPROVING WATER/FERTILIZER MANAGEMENT AND YIELD IN ALMONDS

Situation: As competition for California water increases and concerns mount over groundwater quality, growers face increasing economic and regulatory pressure to farm at levels of fertilizer and water use efficiency thought impossible even 10 years ago. No one better exemplifies this than our Kern County almond growers.

Methods: This effort started with many field trials involving varietal selection and later "long-pruning" techniques pioneered by our retired Kern County UC Almond Farm Advisor, Mario Viveros, Emeritus. Combined with closer tree spacings, these structural changes set the stage for earlier canopy development and increased "bearing surface" per acre. Over the last four years, in cooperation with UC Davis researchers, we have conducted Kern County trials that are the most detailed analysis of nutritional and water needs of almonds ever conducted by UC Cooperative Extension. The key components of this work are noted below.

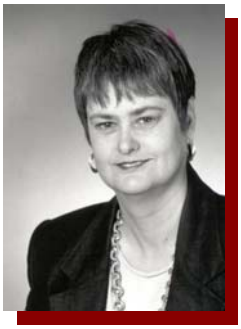


Impact: Maximum water use in unstressed almonds is 30% higher than previously published numbers (top curve, right) and can equal the water consumed by an alfalfa field. But even though it takes more water for this level of irrigation scheduling, when combined with improved fertility management with adequate nitrogen, potassium and phosphorous availability yields can be more than doubled compared to 20 years ago. The current Kern County trials have reached nearly 5,000 lb/ac almond nut yields and a nitrogen use efficiency of 85%.



NUTRITION, FAMILY AND CONSUMER SCIENCE

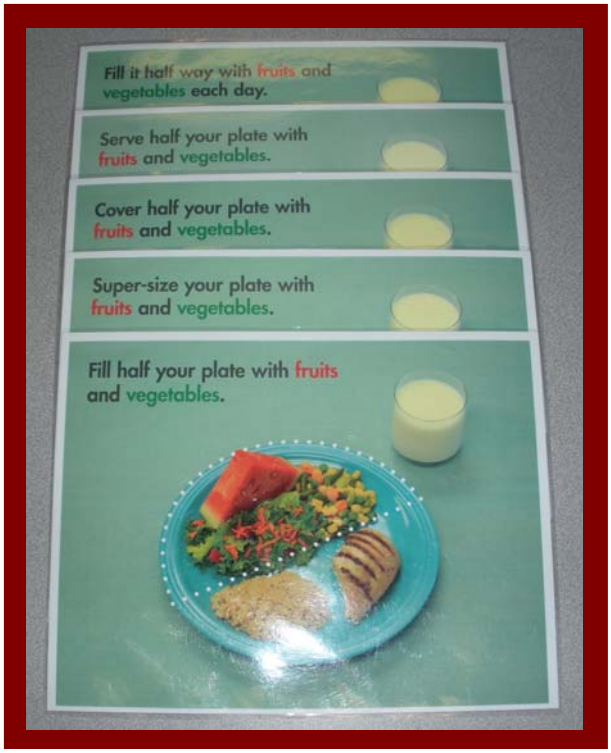
Margaret Johns, Advisor



THE CALIFORNIA PLATE METHOD AND CHILDHOOD OBESITY PREVENTION

Childhood obesity in the U.S. has increased by 300% in the last 25 years. It is common knowledge that obesity is associated with an increase in chronic diseases such as diabetes, certain cancers and heart disease. To encourage family nutrition behaviors which will protect against overweight in children, parents need to be effectively educated about what to do and how to do it. Research has shown helping children maintain a healthy weight is far more effective and efficient than treating them once they have become overweight, and eating plenty of fruits and vegetables is an important element of maintaining a healthy weight. One of the most difficult concepts in nutrition education is in explaining serving sizes. Participants in nutrition classes often find it complicated to measure serving sizes.

University of California Agriculture and Natural Resources division has led the way nationally in the development and testing of the "plate" approach to nutrition education. Several years ago, Nutrition Specialists and NFCS Advisors, developed and tested a graphic almost identical to MyPlate. The work was shared with USDA prior to the adoption of MyPlate by USDA to remind Americans about healthy eating at mealtime. This was the first phase of the California Plate project. Advisors also developed the California Plate intervention curriculum which included posters, handouts, a puzzle magnet, and activities to reinforce nutrition messages, helping participants understand the importance of increasing consumption of fruits and vegetables by serving half of their plate full of fruits and vegetables at each meal. Through this work, the team determined rather than using the plate graphic, pictures of plates that contained real food would make it easier for people to understand the concepts of variety and portions.



The second phase of the project began with reviewing food recalls from participants in the EFNEP program to determine favorite foods. Three groups of food were identified: mainstream American food, African-American favorites and Latino favorite foods. Amateur photos were taken and pilot tested to see how people reacted to the photos and what changes they would make regarding the food combinations. Pilot testing was done with low-income African-Americans, Latinos and Caucasians. Adjustments were made prior to the professional photos were taken of the plates. Pictures of plates appropriate for four-year-olds were also taken. Many parents over feed their children at a young age which leads to a life of overeating. These plate photos have been used in a larger study aimed at teaching parents of preschoolers how much to feed their children as well as how much the parents should be eating.

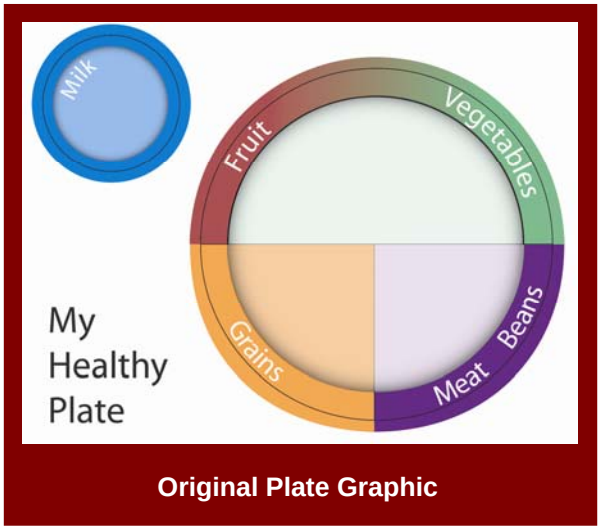
The third phase of this project involved developing and testing messages to accompany the "California Plate" photos. A graphic artist worked with the team to develop the colors and messages. These messages were tested with low-income parents of preschool children.

Extension Methods:

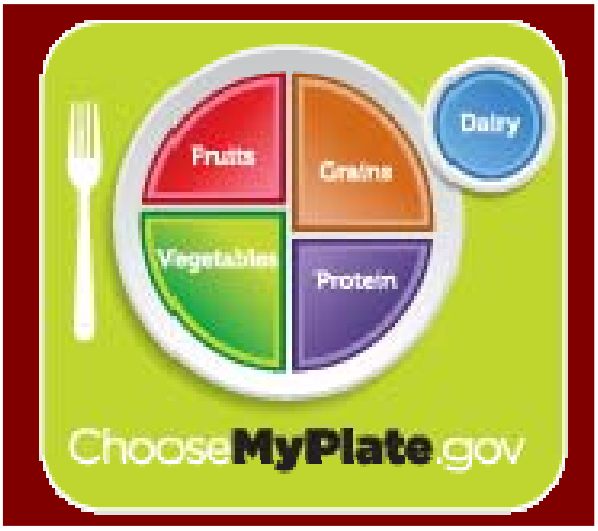
The original plate graphic with accompanying California Plate curriculum was pilot tested with both the EFNEP and FSNEP nutrition education programs. The second phase involved identifying commonly eaten foods from a review of 24-hour recalls (n=165). Depicted foods were adjusted based on feed back from low-income adults (n=227). New photographs were taken of 26 different meals (breakfast, lunch and dinner) for adults and children. These pictures have been used in an educational intervention with parents of pre-school children. Child-size plates with appropriate portions were used to educate the parents about how much and what to feed their children. The California Plate is based on a 10" plate for adults and a 7" plate for children. The third phase of this project involved working with a graphic designer to incorporate nutrition messages to the grill chicken plate photo. In-depth interviews were conducted with English speaking adults (n=64) regarding their preferences for messages to accompany Plate photos and the meaning of the messages. Participants were Hispanic (n=32), white not Latino (n=11), African-American (n=8), American Indian (n=7), Asian, (n=5), other (n=1). The results of the in-depth interviews revealed differences in preferred messages by race and ethnic groups. Additional testing is needed as posters, recipe cards and other materials are developed.

Impact:

The California Plate project promotes healthy eating to prevent obesity, while at the same time creating more demand for California agricultural products by low-income families (fruits, vegetables, nuts, rice and grains, milk and dairy products, eggs, poultry, beef, seafood etc.)



Original Plate Graphic



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.

ROOT KNOT NEMATODE DAMAGE OF CARROTS

The use of fumigants have come under tighter restrictions and regulations in California for several reasons including human safety, VOC (Volatile Organic Compound) emissions (which leads to smog formation), and as an ozone depleter. Although there is much debate on maintaining the use of fumigants in agriculture, alternative methods of nematode management must be investigated. There are viable alternative pesticides for most other soil borne pests but nematodes essentially need to be controlled with the use of fumigants. Fumigants such as 1,3-dichloropropene and metam sodium are routinely used in carrot production in California for nematode control. The carrot industry of California urgently needs alternative methods of nematode control if restrictions on the use of fumigants continue to increase.

A continuation of an investigation into the use of alternative nematicidal products was conducted in 2011 at the Kern County Farm Advisors Research Farm. Most of the products tested are biological or botanical type products. Vydate was included as a standard nematicide for comparison purposes. The treatments MeloCon, Ecozin, Sesamin, Nortica and Ori Agri all significantly reduced the nematode rating and the percent roots with nematode infection. The remaining materials under evaluation also reduced the rating and infection but they were not significant from the non-treated control. Although these materials and others like them need to be evaluated further, this is the first time we have been able to show significant differences with these products.

Carrots with nematode injury.

BACTERIAL EARLY DYING OF POTATOES

A bacterial disease that results in potato yield and quality loss continues to be an important problem in Kern County. The first symptom of bacterial early dying is leaf wilt, which can occur even if fields are recently irrigated. Only some of the leaflets on leaves may wilt; later, the leaves develop necrosis beginning at the margins. In severe cases, the plant may become defoliated from the base upwards. The vascular system in the lower stem near the junction with the seed piece is tan to brown. The pith may also be tan to brown. The rot extends from the seed piece upward. The seed piece is soft rotted and does not have a foul odor. The primary cause is the bacterium *Erwinia carotovora* subsp. *carotovora* (*Ecc*), although *E. chrysanthemi* (*Echr*) causes similar symptoms.

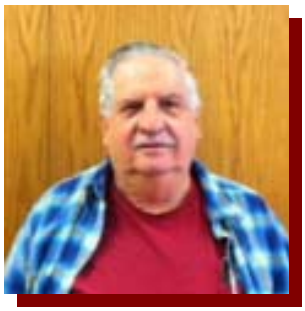
This past year we evaluated several materials in a field trial to see if those products may reduce the incidence of bacterial early dying. The treatments were four commercially available bio-rational products and gypsum as a calcium source. Twenty stems per plot were harvested and rated for vascular discoloration. We were able to show significant differences in the amount of stem discoloration due to bacterial infection with all treatments compared to the control. We hope to repeat that trial in 2012 to confirm our findings.

Infected seed piece and tubers with Erwinia species.

Example of potato field infected with bacterial early dying.

VITICULTURE

Don Luvisi, Farm Advisor, Emeritus



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.

ROOTSTOCK EVALUATION OF 'SCARLET ROYAL' AND 'AUTUMN KING' TABLE GRAPES

'Scarlet Royal' and 'Autumn King' are two new table grape varieties developed by David Ramming and Ronald Tarailo of the USDA-ARS in Parlier, CA, and released to industry. Both are seedless grapes that ripen from mid-September to late October and Autumn King is a late white seedless table grape. Cultural practice work began on these varieties once they were determined to have commercial promise. Since their release, vineyard acreage has expanded in the southern San Joaquin Valley. In response to the recent overwhelming interest in 'Scarlet Royal' and 'Autumn King", our program has worked on various research projects to develop useful management guidelines for growers that result in large, high quality fruit without significantly delaying maturity or sacrificing yield and storage life. Dr. Matthew Fidelibus, Extension Viticulture Extension Specialist, has taken leadership of three rootstock trials to evaluate various rootstocks on the production of table grapes. Rootstocks are important because they can increase vigor, need fewer nutrients, and provide resistance to nematodes. These are long-term projects.

MONITORING AND CONTROL MEASURES FOR PIERCE'S DISEASE

Pierce's disease (PD) caused by the bacterium *Xylella fastidiosa*, is a killer of grapevines. Significant vine loss from PD has occurred in Southern California, North Coast and portions of the southern San Joaquin Valley including Tulare and Fresno counties over the last 100 years. However, the arrival and spread of the glassy-winged sharpshooter (GWSS), a more effective insect vector of the disease, caused devastating losses in the wine-growing regions of Temecula and threatened Kern County.

Recent years has seen an uptick in incidence of PD in the vineyards being tracked. Five vines in 2009 to ten vines in 2010 and 87 samples tested positive in 2011. Vigilance has to be maintained to prevent increased losses from PD by controlling GWSS and rouging diseased vines. The increase detected is more than likely due to not rouging (removing) diseased vines in prior years.

In 2001, we developed a project to track and map the progression of PD over time in selected vineyards in Kern County. The impact of the project is that it provides useful and real year-over-year information on PD epidemiology to local, state and federal agencies to demonstrate that area-wide control of GWSS does in fact reduce the spread of disease. Without this data, the effectiveness of GWSS treatment programs could be questioned and funding could be reduced or eliminated.

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ORGANIZATIONAL CHART