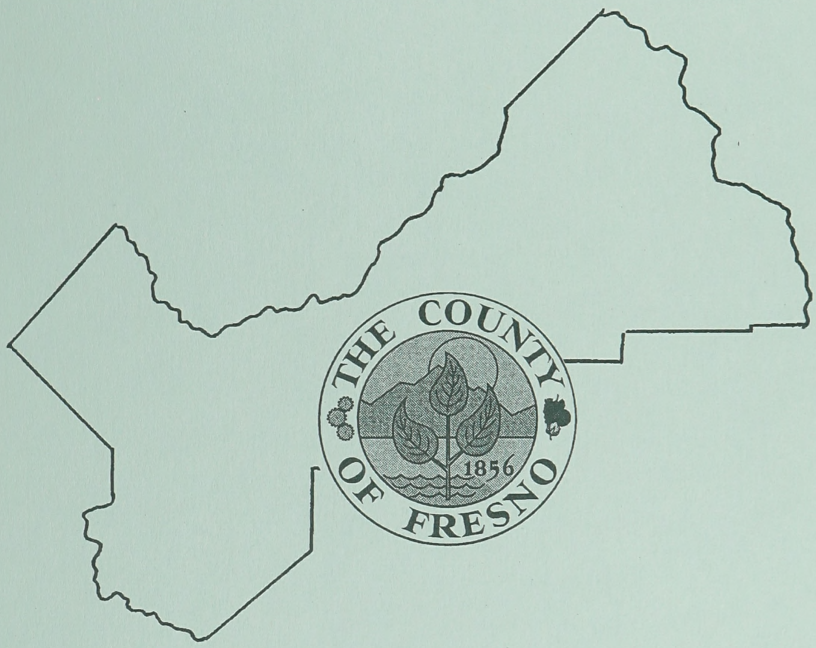
# University of California
# Cooperative Extension
# County of Fresno

# 1995 Year-End Report
## to the
## Fresno County Board of Supervisors




UC CE University of California Cooperative Extension

**The Mission of the Fresno County Cooperative Extension is:**

To serve the people of California through the development and extension of science-based information in agriculture, natural, and human resources.

**University of California Academic Advisors**

**Linda Marie Manton**
County Director

**Harry Andris**
Farm Advisor - Tree Fruit

**Michael Costello**
Farm Advisor - Viticulture

**Richard Coviello**
Farm Advisor - Entomology

**Pamela Elam**
Farm Advisor - Environmental Horticulture

**Mark Freeman**
Farm Advisor - Citrus/Nut Crops

**Kurt Hembree**
Farm Advisor - Vegetation Management

**Jerry Higginbotham**
Farm Advisor - Dairy

**Donald May**
Farm Advisor - Vegetables

**Richard Molinar**
Farm Advisor - Labor Intensive Vegetables/Strawberries

**Shannon Mueller**
Farm Advisor - Agronomy

**Dan Munk**
Farm Advisor - Water/Soils/Cotton

**Dave Snell**
Advisor - 4-H Youth Development

**Jeanette Sutherlin**
Advisor - Nutrition, Family and Consumer Sciences

**Steve Sutter**
Farm Advisor - Personnel Management

**Program Representatives**

Barbara Wortham  Sallie Yoshida

**County Staff**

**Administrative Support Staff**

Karen Nephew, Office Manager

| | |
|---|---|
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| Leo Mariano | Wanda Palmer |
| Chrys Moore | Stephanie Sharp |
| Yolanda Murillo | Nancy Shaw |

**Nutrition Education Assistants**

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|---|---|
| Maria Cruz-Pascacio | Esther Mendiola |
| Yolanda Lopez | Sua Vang |
| Janet Marshall | |

**Grant & Gift Funded Research Support Staff**

| | |
|---|---|
| Jeffrey Heither | Rose Prather |
| Wendy Kronman | Jon Wroble |
| Lupe Ortiz | Michael Yang |

**And the many 4-H Youth Development, Master Gardener & Master Food Preserver Volunteers**

July 1996

To the Fresno County Board of Supervisors:

This report for 1995 is submitted to you with pride in the staff's accomplishments and gratitude to the Board of Supervisors for their consistent support.

Exciting things are happening in Cooperative Extension. We are pleased to announce a new Regional Director, Dr. Charles Crabb. Dr. WR (Reg) Gomes is the new Vice President for the University of California, Division of Agriculture and Natural Resources, the umbrella division for Cooperative Extension.

Technological advances in communications are creating a whole new way of looking at information and accessing it. We look forward to increasing our access to and expertise in tapping world wide resources for local application.

As a cooperatively funded department, deriving its total budget from County, State and Federal, and private funds, Cooperative Extension continues to return excellent value to the community. Nine percent of the budget comes from the County. Our programs could not be conducted without the support of our nearly 1,000 volunteers who donated approximately 82,000 hours in 1995.

Our advisors in addition have raised $250,000 in grants and unrestricted funds in 1995 and reinvesting those dollars in the county through salaries for research support staff and purchase of research materials.

Since 1914 Cooperative Extension has been a very active part of Fresno County and we look forward to being a continued service through conducting research and extending that research in the programmatic areas of agriculture, natural resources, environment, nutrition, family and consumer sciences, and 4-H and youth development.

In this report the advisors housed in Fresno County have given you an over view of their programs. As would be expected their programs and research have much more depth than what could be expressed in this short report. If you have further questions, please contact our department.

Sincerely,

Linda Marie Manton

Linda Marie Manton, MS, CFCS
County Director/Department Head

*To simplify information, trade names of products have been used. No endorsement of named products is intended, nor is criticism implied of similar products which are not mentioned.*

*Harry L. Andris, MS*
Farm Advisor - Fresh Shipping Tree Fruits

Years Serving Fresno County: 18

**Program**

In my fresh shipping tree fruits position, I have the responsibility for conducting an applied research and educational program for growers, fieldmen, pest control advisors, and the related agribusinesses of 14 separate tree crops. My focus is in developing and extending new information to these groups which will improve fruit quality and the profitability of the tree fruit industry, while reducing potential environmental hazards associated with chemical and fertilizer use.

**Situation Statement**

Fresno County is world famous for its production of tree fruits. Many of these commodities have steadily increased in acreage and production over the past ten years. This is most evident in the apple, cherry, and prune acreage and production. Developing new cultural techniques which increase the marketability and the profitability of stone fruits and pome fruits has been a major focus of my program. In this regard, I developed new techniques to improve the color on stone fruits and pome fruits, such as nectarines and apples through the use of reflective materials. The dramatic results have greatly improved the marketability of these commodities. Since tree fruits require a large amount of nitrogen fertilizer in their production, there is the potential for nitrate pollution of the groundwater in some soil types. I have developed new fertilization techniques which reduce nitrate pollution while utilizing waste products as a source of nutrition for tree fruit growers. These programs have improved the marketability of tree fruit and improved the sustainability of our agricultural lands.

**Research**

Comparative Affect of Nitrogen Source Materials on Peach Production, Fruit Quality, Insect and Disease Incidence, and Nitrate Leaching

Since the introduction of inorganic forms of nitrogen, following World War II, agriculture has had a nearly inexhaustible and relatively inexpensive supply of nitrogen. As a result, plant growth and agricultural production has increased dramatically. At the same time, there has been an accumulation of the nitrate ion in our underground water supplies. This nitrate accumulation has both legislators as well as environmental groups concerned about the human health risk associated with high nitrates in the groundwater supply. There are many areas of the Central San Joaquin Valley where permanent crops can be maintained without the addition of supplemental fertilizer, due to the amount of nitrate ion found in the irrigation water. Tree crops have been identified as one of the major users of nitrogen fertilizer and a major contributor to the nitrate pollution problem. Identifying and quantifying the effects of alternative sources of nitrogen, which may be less readily leached below the root zone, will help growers make intelligent decisions about the type of fertilizer they select.

Objectives

1. To critically compare the performance of green waste compost to the performance of standard materials currently used in commercial tree fruit production. These include ammonium nitrate, manure, manure compost, and pelletized chicken manure.

2. To evaluate the effect of these different nitrogen source materials (applied at the same rate of nitrogen per acre) on tree growth, plant nutrition, production, fruit quality, insect and disease incidence.

3. Evaluate the movement of nitrate ions over time through the soil.

4. Determine if the different treatments impact flavor, smell, texture, or other aspects which are discernible by a consumer taste test evaluation.

Results

This is a well coordinated and financed project which has thus far produced interesting results with regard to the use of green waste compost. For the past two consecutive seasons, brown rot appears to be reduced where the green waste compost has been used. This reduction in brown rot of fruit in storage is a direct result of a pink mucoid yeast which is present on the surface of the fruit. All treatments have this yeast on the surface of the fruit, but the green waste compost treatment supports far more propogules; thus, inhibiting brown rot decay. The results further show that high quality green waste compost is easy to apply, free of weed seed, insects, and chemical residue. Nutritional analysis indicates that green waste compost appears to compare favorably to the standard fertilizer materials historically used in tree crop fertilization. It appears to improve the organic matter of the soil, while comparing favorably in fruit quality parameters as compared to the other fertilizer products.

Impact

With the passage of Senate Bill AB-939, the green waste currently going to landfills will need to be reduced by 50% by the year 2000. This trial is the oldest of its kind in California and is beginning to answer many of the questions growers have about the use of green waste compost. Several newspaper and magazine articles and press releases have discussed this trial. We have had a grower field demonstration with more planned for the future. This trial was a featured topic at the 1994 West Coast BioCycle Conference in San Francisco.

Evaluation of Alternatives to Soil Applied Leachable Nitrogen

The Federal Environmental Protection Agency has identified tree fruit (which includes nut crops and citrus as well as fresh shipping tree fruits) as being commodities which use large amounts of nitrogen fertilizer in their production. As a result, there is a potential to leach nitrate ions into the underground water supply in some soil types across the county. Finding an efficient way of fulfilling the nitrogen requirement of tree crops by means other than applying nitrogen to the soil would greatly reduce the potential for nitrate leaching.

Objectives

1. Determine if high concentrations of nitrogen can be taken into peach leaves through fall foliar applications of low biuret urea.

2. Determine if the nitrogen is mobilized and moved to other plant parts.

3. Determine the effect on leaves, shoots, and flower buds from a fall application of low biuret urea.

4. Determine the appropriate concentration for peach and nectarine applications.

5. Determine if the uptake of micronutrients, such as zinc, will be compatible or enhanced when combined with high concentrations of the low biuret urea sprays.

Results

The first four objectives have been successfully completed with very positive results. At the 1995 Fresh Market Stone Fruit Workgroup meeting, the farm advisors were given an in-house procedure for growers to use, should they wish to try this new fertilization technique. This method of

fertilization of stone fruit was presented by Scott Johnson at the American Society for Horticultural Science meeting in Corvallis, Oregon in 1994. There has been great interest in technique since it was formally introduced at that meeting. The final phase of this project, looking at the effects of zinc uptake in combination with foliar urea, is currently under study. Steven Purcell of the UNOCAL Chemical Company is now planning to expand this research to include almonds, pears, prunes, and other commodities.

Impact

This research has great potential to reduce nitrate pollution of our groundwater by reducing the volume of soil applied nitrogen currently being used. This fertilization method should have worldwide potential use and should be of particular importance in areas where the nitrate levels in the groundwater are approaching the danger threshold. If the mixture of low biuret urea plus zinc (applied as a fall foliar spray) proves to be beneficial, then growers who normally apply zinc in the fall of the year would simply include the urea to their tank mix. They would then reduce or eliminate their spring or summer soil nitrogen applications. Growers are now beginning to try this technique of foliar fertilization. It has been discussed at recent meetings and interest in trying this technique continues to increase.

Effect of Reflective Materials for Enhancing Color on Fuji Apple

Fuji apple clones represent the second largest producing apple acreage in California. Fuji apples are grown throughout the world; however, few of the world's Fuji crop have the balance and flavor of a California grown Fuji apple. Unfortunately, due to the hot summer days and warm summer nights our Fuji apples do not develop a full red surface color which is typical in climates with cooler nighttime temperatures. Most of California's Fuji apples have a yellow background color with some red stripping or blush. By increasing the surface red color to 15% or more, the apple grade is increased to the fancy or extra fancy. This represents an enormous value to the grower in dollar return. Historically, growers have attempted to increase their surface color by holding the fruit on the tree longer in the season when the nighttime temperatures begin to cool off. Unfortunately, by allowing the apples to hang longer on the trees, they become physiologically overmature and develop a serious surface skin cracking problem called "checking." Serious "checking" problems reduces the fruit's value to that of the juice price if it can be sold at all.

Objectives

1. Determine if reflecting light into the canopy and onto the fruit surface would improve the percentage of red color on the fruit.

2. Determine what other factors might be affected by the reflected light.

3. Determine if the technique is cost effective.

Results

The results of these trials produced a 33% increase in the amount of fruit harvested in the first picking with a significant increase in fancy and extra fancy grades. An increase was also achieved in the US #1 grade with significant reductions in the utility grade. The apples were significantly larger as well. Surface color improved from an average of 7% of the surface with red color to an average fruit developing 14% of the surface with red color. Since the apples developed more red color, as well as a more yellow background color, they could be picked earlier; thus, reducing the skin "checking" problem. The dollar return to the grower has been substantial. On early harvested fruit, this has increased the return from $7 per box to over $40 per box. This reflective material is now widely used in the stone fruit industry by nectarine, peach, and cherry growers.

Impact

This has been a very successful and gratifying project with immediate adoption by industry. Approximately 30% of the Fuji apple growers used reflective material in the 1995 season. In addition, several of the nectarine and peach growers in Fresno, Tulare, and Kings counties have used this material to improve the color on their nectarines and peaches. Cherry growers are also experimenting with this technique to increase the color of their lower fruit, which is last to develop color.

**Educational Activities**

California Integrated Waste Management Board Meeting, Effects of Green Waste Compost Use on Fresh Market Peaches
Modesto, CA, September 11, 1995

Republic of China Quarantine Inspection Delegation
Cultural Practices of Plum
Reedley, CA, August 21, 1995

American Society for Horticultural Science, Effect of Reflective Materials on Improving Fuji Apple Color and Fruit Size
Montreal, Canada, August 1, 1995

ASCS/USDA Board Meeting
Cultural Practices for Flame Seedless Table Grapes
Fresno, CA, August 4, 1995

ASCS/USDA Board Meeting
Causes of "Checking" in Fuji Apple
Fresno, CA, July 25, 1995

Apple Workgroup Meeting
Effect of Reflected Light on Fuji Apple
Watsonville, CA, July 11, 1995

Integrated Waste Management Board
Compost Use Field Demonstration
History of Green Waste Compost Use in Field Demonstration
Clovis, CA, June 20, 1995

Waste Management Workgroup Meeting
Green Waste Compost Use in Fresh Market Peaches
Monterey, CA, June 14, 1995

Orchard Odyssey Field Tour
Discussion of Soil Amendments and Compost
Parlier, May 23-24, 1995

Prune Production Workshop #2
Diagnosing Soil Problems and Using a Soil Analysis
Visalia, CA, April 27, 1995

California Integrated Waste Management Board Meeting
Effect of Compost Use in Fresh Market Peaches
Fresno, CA, April 6, 1995

Mid Valley Apple Association
Effects of Reflective Materials to Enhance Fuji Apple Color
Stockton, CA, March 23, 1995

West Coast Bio-Cycle Conference
Effects of Green Waste Compost on Fresh Shipping Peaches
San Francisco, CA, March 13, 1995

Northern California Apple Postharvest Day
Improving Apple Color
Modesto, CA, March 8, 1995

Postharvest Day
Improving Apple Color
Parlier, March 7, 1995

Stone Fruits and Almond Sustainable Agriculture Conference
Production Techniques Moderator
Parlier, March 1, 1995

Prune Production Workshop #1
Irrigation Systems for Prunes
Visalia, CA, February 23, 1995

California Tree Fruit Agreement Research Reports
Effect of Foliar Applied Low Biuret Urea on Stone Fruit Nitrogen Uptake
Parlier, February 15, 1995

Fresh Market Stone Fruit Workgroup Meeting
Chairman/Moderator
Parlier, February 14, 1995

Future Farmers of America Pruning Contest Judge School Pruning Teams and Discuss Judgments
Fresno, February 4, 1995

Prune Tree Pruning Demonstration
Assist in Tulare County Demonstration
Visalia, CA, December 5, 1995

Prune Tree Pruning Demonstration
Demonstrate Pruning Techniques with Assistance of Tulare County Farm Advisor
Easton, CA, December 5, 1995

**Publications**

Harry Andris and James Doyle, Follow Up Care of Grafted Trees, Pomology Facts #1, University of California Cooperative Extension Pomology One Sheet Answer, 1995.

Harry Andris, Scott Johnson, and Kevin Day, Evaluation of Alternatives to Soil Applied Nitrogen, 1994 Research Reports California Peaches and Nectarines, California Tree Fruit Agreement. Published May, 1995.

Kevin Day, Harry Andris, Carlos Crisosto, Gayle Crisosto, Ted M. DeJong, R. Scott Johnson and David Garner, Preharvest Factors Affecting Fruit Quality at Harvest and in Storage, 1994 Research Reports California Peaches and Nectarines, California Tree Fruit Agreement. Published May, 1995.

R. Scott Johnson, Kent Daane, Bill Barnett, Tim Prather, Themis Michailides, Kevin Day, and Harry Andris, Developing an Integrated Peach and Nectarine Orchard Management System with Less Dependence on Synthetic Pesticides and Fertilizers, 1994 Research Reports California Peaches and Nectarines, California Tree Fruit Agreement. Published May, 1995.

R. Scott Johnson, Claude Phene, Richard Mead, Bob Beede, Harry Andris, Kevin Day, Water Use and Water Management of Mid to Late Season Stone Fruits, 1994 Research Reports California Peaches and Nectarines, California Tree Fruit Agreement. Published May, 1995.

Harry Andris and Scott Johnson, New Approaches to Nitrogen Fertilization of Stone Fruits, Kearney Tree Fruit Review, Volume 1, 1995.

Harry Andris and Carlos Crisosto, Enhancing Fuji Apple Color With Reflective Materials, Kearney Tree Fruit Review, Volume 1, 1995.

Harry Andris, Apple Orchard Systems, Kearney Tree Fruit Review, Volume 1, 1995.

Harry L. Andris and Carlos Crisosto, Improvement of Fuji Apple Color and Fruit Size Using Reflective Materials, HortScience, Volume 30, Number 4, July 1995.

Harry Andris, Irrigation Systems for Orchard Crops, Fresno County Publication, 1995.

Harry Andris, Diagnosing Soil Problems and Using a Soil Analysis, Fresno County Publication, 1995.

*Michael J. Costello, Ph.D.*
Farm Advisor - Viticulture

Years Serving Fresno County: 1

**Program**

My program covers all aspects of raisin, wine and table grape production in Fresno County. Because my background is in entomology, my research program has a strong pest management component, with emphasis on biological controls or chemical controls using integrated pest management (IPM) or sustainable agriculture principles. In a broad sense, the goal of every one of my projects is to aid Fresno County growers in the profitable production of high quality grapes, using management practices that are safe, efficient and effective.

**Situation Statement**

Grapes are one of Fresno County's leading crops, Over 210,000 acres with a farm gate value of nearly $500 million. Nearly one-third of California's grape acreage is in Fresno County. Grape growing offers an array of challenges, especially when considering that management practices differ widely depending on whether the grapes are grown for raisins, fresh market (table grapes), or wine. Fresno County has a high proportion of small grape farms and part time growers. Average farm size is approximately 40 acres, and the number of owners, operators and managers of grape vineyards is estimated at about 4,500.

**Research**

Using Narrow Range Oil and Cover Crops for Mite Management
Funded by: UC Pesticide Impact Assessment Program & UC Sustainable Agriculture and Research Program

Spider mites, are consistent and economically important arthropod pests of grapes in Fresno County. Feeding by Pacific mite causes chlorotic stippling of the leaves, and high populations reduce photosynthetic rates and delay sugar accumulation in the berries. Conventional chemical controls are effective, but do not sustain populations of predatory mites, which are beneficial. A possible alternative to synthetic chemical treatment of Pacific mite is the use of horticultural oils, which are designed to suffocate small arthropods. If the use of summer oils can bring a Pacific mite outbreak population down to an acceptable level while conserving predatory mites, it would facilitate transition from a chemical control program to a sustained predator/prey balance that only rarely requires treatment.

Alternatives to Propargite for Mite Control
Funded by: Sun Maid Growers, Monterey Chemical Co., BASF Co.

Propargite is by far the most commonly used chemical treatment for spider mite control in Fresno County. However, propargite is on the US EPA list of pesticides which are scheduled for registration cancellation because they do not meet the standards set under the Delaney Clause. Already, at least one raisin packer has disallowed use of propargite for its growers and others are strongly discouraging its use. This study looks at several miticides as possible alternatives to propargite, including fenbutatin-oxide, narrow range oil and abamectin, and tests their efficacy at early (10% mite infestation) and standard (50% mite infestation) application points.

Impact of Predators on Key Vineyard Pests
Funded by: USDA National Research Initiative.

Spiders are the major group of vineyard predators in Fresno County (beneficial in

that they consume other insects, including pests). The objectives of this study are twofold: 1) determine if predation by spiders on vineyard pests is occurring and estimate the rate of predation using serological analyses. Serological methodology uses antibodies which react only with certain pests, such as leafhoppers. The antibodies are then added to crushed, field collected predators; if a reaction is found (above a certain background threshold), then that predator is scored as having consumed a leafhopper; 2) determine the effects of cover crops, including the mechanisms involved, on leafhopper and predator populations. Cover crops are grasses or legumes grown between vine rows, and can provide greater habitat for predators and their prey or alter vineyard microclimate, which may influence predator or pest populations.

Biologically Integrated Vineyard Systems
Funded by: US Environmental Protection Agency & California Department of Pesticide Regulation

I am part of a project entitled "biologically integrated vineyard systems" (BIVS) for Fresno County, based on the very successful BIOS model developed in almond orchards in Merced County. The BIOS model has four main components: 1) establishment of a support network for grower participants, 2) establishment of an advisory team to help guide the grower participants, 3) establish a set of guidelines and goals for each grower participant, 4) monitor acreage set aside under the BIVS program, 5) demonstrate BIVS systems through field days. We hope that this framework will help Fresno County BIVS growers overcome the psychological and technical obstacles to implementation of efficient, environmentally sound and economically viable production systems.

Evaluation of Nematode Resistant Rootstocks for Early Ripening Raisin Varieties

Over the coming decades, thousands of vineyard acres in Fresno County will be replanted to earlier ripening raisin grape varieties such as 'Fiesta' and the recently released 'DOVine'. Because of the risk of damaging nematode infestation in replanted vineyards, it is necessary to determine the compatibility of nematode resistant rootstocks. This study, which is just underway, looks at grape growth and yield parameters when planted on seven different nematode resistant rootstocks, including Harmony, Freedom and Ramsey, as well as four unreleased rootstocks.

**Educational Activities**

Meetings

February 1995
Moderated the Dinuba Table Grape Symposium, an annual presentation of results by researchers to the table grape community

April 1995
"Phylloxera in the San Joaquin Valley", presentation at Grape Day, sponsored by Grape Grower magazine, Madera Fairgrounds

March - July 1995
Gave monthly pest management presentations at on-farm "Best Management Practices" meetings organized by Sun Maid

May 1995
"Influence of cover crops on predators and leafhoppers in grape vineyards", presentation at the annual UC Cooperative Extension and UC Davis Department of Viticulture and Enology joint conference.

July - December 1995
Organized and conducted monthly breakfast meetings for the Biologically Integrated Vineyards Systems (BIVS) program.

October 1995
Organized a seminar at the Cooperative Extension office in Fresno on managing cover crops in vineyards, and gave a presentation entitled "Can cover crops encourage natural enemies in vineyards?"

October 1995
Organized a cover crops planting demonstration day for growers, involving members of the seed and farm equipment industries.

**Clientele Served**

My primary clientele are all owners, operators and managers of commercial grape growing operations in Fresno County. In addition, I have identified a secondary clientele consisting of pest control advisors who operate within Fresno County. I also provide information to prospective vineyard owners, insurance agents, bankers, law firms, out of state growers, private research institutions, other state and federal agencies and agricultural suppliers.

**Publications**

Trade Journals

Leafhopper and spider mite control, Grape Grower, July 1995

Cover crops in the vineyard, California Grower, Sept. 1995

Fall seeded cover crops for vineyards, Agribusiness Fresh Fruit and Raisin News, Oct. 1995

Refereed Publications

Costello, M. J. and K. M. Daane. 1995. Spider species composition and seasonal abundance in San Joaquin Valley grape vineyards. Environmental Entomology, 24: 823-831.

Costello, M. J., M. A. Mayse, K. M. Daane, W. A. O'Keefe and C. B. Sisk. 1995. Spiders in San Joaquin Valley grape vineyards. UC DANR Leaflet # 21530.

Newsletters

March 1995
Introduction of new viticulture farm advisor

June 1995
Leafhopper and mite control
Call for participants in BIVS

September 1995
If raisins get rained on
Cover cropping in vineyards
Soil ripping
Fall fertilization

December 1995
Preemergent herbicides
Winegrape varieties

Television and Radio Interviews

| | |
|---|---|
| June 1995 | KMPH - Comments on hailstorm damage |
| July 1995 | KMPH - Call for BIVS participants |
| Sept 1995 | KMPH - Harvest outlook |
| Dec. 1995 | KMPH - Warm fall weather and pruning |

*Richard L. Coviello, MS*
Farm Advisor - Entomology and Insect Pest Management

Years Serving Fresno County and California: 25+

**Program**

My responsibilities are to develop and extend knowledge regarding insect pest management as it relates to the many and varied crops grown in Fresno County. My primary focus is research on methodology to determine the extent on pest impact on crops and techniques for efficient and environmentally benign management of those pests.

**Situation Statement**

Fresno County is one of the most productive and diverse agricultural areas in the world. The range of crops grown is unequaled anywhere else. This, of course, means that there are a great diversity of insect pests that have an impact on the production of these crops. Fresno County and the Central San Joaquin Valley are fortunate in that our climate is excellent for crops but not for some of the insects and diseases which plague other areas. We, for the present, do not have some of the intransigent insect pests such as boll weevil, European corn borer and pink boll worm which devastate other regions. Some of the insects we do have such as Russian wheat aphid and tobacco budworm do not build to the crop destroying numbers here as they can in other parts of the country. As a result, we do not use as much insecticide on a per crop basis as do other areas, although this is difficult to prove since no other states require growers to report all pesticide use.

We do, however, have a large variety of insect pests and we are constantly threatened by the invasion of exotic pests which could limit our agricultural production and marketing. Among the significant issues facing agricultural pest management are 1. the increasing loss of pesticides due to regulatory action or pesticide resistance, 2. the increased cost and difficulty to replace the lost materials, 3. the introduction of insect pests new to the region, such as the silverleaf whitefly and 4. the increasing restraints on resources for the development of alternative technologies.

**Research**

*Liriomyza trifolii* (Celery Leafminer)

Processing tomatoes has become the major vegetable crop grown in Fresno County. We have been fortunate to have few significant insect pests damaging to tomatoes. However, in the last four years a relatively new pest, a serpentine leafminer, *Liriomyza trifolii*, sometimes referred to as the celery leafminer, has become an important pest of mid to late season tomatoes as well as other field and vegetable crops. The insect feeds in the leaves causing defoliation which leads to reduced yield and quality. I have begun a study to determine economic damage levels from which to develop treatment thresholds. The study also includes developing a rapid sampling method that pest control professionals can use for routine monitoring of the pest on the crop. Preliminary results show that uncontrolled leafminer infestations can lead to a 15 to 20% reduction in yield of processing tomatoes or a potential loss of up to $40 million dollars. A rapid sampling method using the presence/absence technique shows promise of providing an accurate estimation of field populations of the pest. Along with the sampling and threshold studies, I am conducting trials of various new non-disruptive insecticides to serve as alternatives to the one effective material now registered for use. This is essential for the prevention of pesticide resistance.

Omnivorous Leafroller

Omnivorous leafroller is a chronic pest of most varieties of grapes grown in Fresno County. Treatments for leafroller have been applied according to the stage of growth of the vine in the past. This has led to control failures in some years since the physiology of the insect does not respond to the weather at the same rate that the vine does. Thus sprays timed to the vine growth sometimes miss the most susceptible time for the pest. This is especially important for growers using "biorational" pesticides such as the Bacillus thuringiensis products which do not have a long residual effectiveness in the vineyard. I am conducting a treatment timing study to develop data to use existing information on the life cycle or phenology of omnivorous leafroller to accurately time treatments. This is based on the degree-day concept which is an index of the pest development over time as it is affected by temperature. This concept has been used to improve control efforts for other pests such as codling moth, peach twig borer and San Jose scale and has resulted in much reduced pesticide use while achieving better control.

Onion Thrips

Damage threshold study of thrips on processing onions. The objective is to develop data showing the thrips population levels which significantly reduce processing onion yield and quality. This is new information and will allow growers to use an objective treatment threshold rather than a subjective "seat-of-the-pants" estimation.

BIFS Project

The west side of Fresno County has some of the most productive agriculture in the world. However, growers have noticed an apparent reduction in yields over the last 10 to 12 years, evidently associated with the reduction in acreage of winter cereals. I am cooperating with several other University researchers in a long term project referred to as the Biologically Intensive Farming Systems Project (BIFS Project). This is in association with some of the larger and most progressive farmers on the west side. The objective of the project is to develop farming systems in which increased additions of organic matter to the soil using composts and cover crops can be incorporated into the current crop rotations. Project personnel include agronomists, weed scientists, plant pathologists, and other entomologists. My interests include developing the technology to deal with the seedling pests which will likely become problematic in a high organic content soil situation and to evaluate alternative, less disruptive management methods for some of the foliar pests.

**Educational Activities**

I am called to plan, assist or speak at numerous events every year on various entomology and pest management subjects. The following are some of the functions in which I've participated in 1995.

- Sierra Ag. grower meeting, Fresno, Assisted planning, presentation on omnivorous leafroller biology and management.
- Monthly Almond Grower breakfast meetings.
- Sunmaid Growers Monthly Field Meetings
- UCIPM Grape Pest Management Workshop, Assisted planning, presentation on lepidopterous pests of grapes.
- Processing Tomato Meeting, Leafminers and armyworms biology and management.
- Pesticide Applicators Professional Association Meeting, Fresno, Omnivorous Leafroller Treatment Timing
- Chamber of Commerce luncheon meeting, Fresno, Biology of Mediterranean Fruit fly.
- Western Farm Service PCA Update Meeting, Fresno, Insect pests and beneficials identification and biology.
- Committee for Sustainable Agriculture grower mtg. for Trees and Vines, Omnivorous Leafroller Treatment Timing.

Committee for Sustainable Agriculture grower mtg. for Field and Veg. Crops, Onion Thrips Damage Thresholds.
Kawanis Club luncheon meeting, Biology of Mediterranean Fruit fly.
Melon Day, Discussion of aphid/leafminer screening trials.
Tomato Day, Discussion of Leafminer Economic Threshold trial.
Grape Pest Mgmnt Workshop, Lepidopterous Pest Identification & Management.

I also record a weekly message for our telephone call-in service known as Agline. This is a service where individuals call for a recorded message regarding various aspects of growing crops from irrigation to pest management. My message is a weekly update of phenology or degree-day information for several of the tree crop pests in the area. This helps growers and PCAs to plan their management options.

**Clientele Served**

My clientele include growers and farm managers and allied agricultural industries. My primary contacts are through the pest control professionals, such as Pest Control Advisors, applicators, pest management supply venders and chemical company representatives, who have a dramatic multiplier effect to my efforts.

**Publications**

Popular

Coviello, R., and M. McGiffen. Damage Threshold for Thrips on Drying Onions. Central Valley Farmer. 2 (5) Mar. 1, 1995. 6, 12.

Newsletters

Coviello, R. L., and M. E. McGiffen. 1995. Damage Threshold for Thrips on Drying Onions. UCKAC Plant Protection Quarterly. 5 (1). Newsletter. 2-4

Dibble, John E. and Richard L. Coviello. 1995. Dormant Spraying of Fruit Trees in the Garden. HortScript. Sept., 1995, No. 17. Newsletter

*Pamela M Elam, MS*
Farm Advisor-Environmental Horticulture
Years Serving Fresno County: 16

**Program**

My assigned responsibilities include Urban and Environmental Horticulture. This specifically means that I address the research and educational needs of both the residents of Fresno County who have interests in ornamental and home food production gardening and the commercial clientele involved in professional landscape management (including arboriculture, nursery and floriculture, and turf management). I also have minor responsibilities in the area of biomass and Christmas trees. My research and education program is centered on the current and relevant issues: Landscape sustainability, water conservation, green waste reduction and integrated pest management. The environmental horticulture program issues addressed have been: integrated pest management, landscape sustainability, green waste reduction and community development by way of volunteerism. I have integrated these same priority issues into my research and creative activity as part of my program. I have set up and provide the ongoing leadership and management for the Master Gardener Program. I have implemented the design, installation and ongoing management of 1.4 acre demonstration garden called "Garden of the Sun" as an extension teaching tool on those issues.

**Educational Activities**

The primary goal in my educational activities is to focus on information and education relating to integrated pest management, sustainable landscape, and green waste management. The reason for this focus in these primary areas relates directly to the identified Division of Agriculture and Natural Resources high priorities and because of state laws requiring reductions of solid waste and the implementation of water conservation ordinances. While my job is educational and not at all a part of the regulatory process, I feel I do need to provide clientele with the tools and information to allow them ways to comply with this legislation. Also, with the introduction of Silver Leaf Whitefly, and concerns about non-target impacts of pesticide applications, the extension of techniques on utilizing integrated pest management strategies has also been a high priority.

I also would like to point out that my two major clientele groups are extremely diverse. I have a commercial clientele that consist of professionals in the turf production and management industry, arboriculture, landscape management, and the floriculture and nursery industry. My consumer horticulture clientele consists of a large part of the general population in the county who have an interest or need in home landscape and gardening.

**Situation Statement**

Commercial Landscape/Turf Management

There are hundreds of businesses in the turf and landscape management industry in Fresno County. Most of them are family owned business with 4-7 employees and most are moderately successful business operations. Many of the businesses, while knowledgeable about some of the landscape management practices, have little expertise in pest management practices. In addition, many of the school districts and municipalities also have landscape managers. Many of the individuals responsible for the landscape may have very little experience in that they have been shifted from janitorial services to landscape services as a budget saving measure. As well, the school

districts or municipalities often have very little money set aside for training. Lastly, there is a group of very highly skilled landscape and turf or golf course managers who are looking for more sophisticated educational experiences. The following projects were conducted to fill the diverse needs of those clientele.

Integrated Approach for Aphids and Scale

Objective

To provide in-depth presentation of management practices of aphids and scale on ornamentals to landscape managers utilizing and adapting state of the art techniques in integrated pest management (IPM).

Methods

I participated in a series of meetings throughout the state, which were sponsored by other organizations, and presented a well researched and articulated slide presentation, and prepared presentation handouts which was a synopsis of the current aphid and scale pest species, their hosts and monitoring and management practices. Some examples of the meetings I spoke at included: three PAPA meetings in various parts of the state, including Fresno County, one CAPCA meeting, NCTLC meeting in San Francisco, a regional meeting for the International Society of Arboriculture and at the Landscape Gardeners Equipment and Trade show. I also utilized the same information in a "hands-on" format at the Target Specialty Products Trade show.

Clientele Served

These meetings typically have an audience between 50 and 500 hundred and because the quality of the presentation was good, I was asked to give the same presentation at other meetings. My major accomplishment was the ability to maximize my time by pulling together a major talk for many meetings instead of constantly preparing for different programs. As well, by putting the information in a concise format and presenting several times, the industry now understands the importance of monitoring for optimum treatment windows and alternatives to traditional pesticide applications.

Landscape Tree Care and Management for School Districts

Objective

To train municipal and school district landscape managers on proper landscape tree planting, staking, training and pruning techniques. Properly planted and trained trees develop into long lived, lower maintenance and sustainable trees than those which are improperly cared for.

Methods

I felt that many of the smaller communities really needed assistance in learning how to plant and care for their landscape trees. This was evidenced by the way trees had been cared for in the past, i.e. poor pruning practices, poor tree development and improper staking. Because they had so little money available for sending employees to training seminars, I went to them. I approached the smaller school districts and communities and said I would be willing to provide an all day training on tree care for their staff if they provided the facilities, the lunch and any registration that they required. The cities of Sanger and Coalinga as well as the Clovis School District and Tree Fresno all had a personalized all day training program for their staff.

Accomplishments

The presentation was essentially the same presentation for each group, which maximized my time commitment the project. The cities and school districts made all the arrangements which also helped to encourage their buy-in to the project. I was able to have the participants learn about proper tree care and ultimately the communities benefited the most because they have trained staff that can properly train and prune trees. Long term, that leads to more sustainable landscapes which require less care.

**Situation Statement**

Consumer Educational-Horticultural Activities

In the area of consumer horticulture, it is difficult to meet the needs of people on a one to one basis. My goal is to provide issue driven information as well as increase awareness of the University of California Cooperative Extension (UCCE) in the region to consumer horticulture/general public audience in a way that avoids extensive use of one-on-one interaction. I use media extensively to reach this goal, writing a weekly gardening column for the Fresno Bee, conducting a weekly live garden television show on PBS called *The Practical Gardener* and I do a weekly live news spot on KSEE 24 as a means of getting current information out on the identified issues. I also provide home horticulture education classes at our demonstration garden two times a week. I find these excellent ways to provide information and knowledge in the area of home horticulture.

Accomplishments

The goal of providing issue driven information to a large audience without increasing one-on-one interaction has been accomplished. Television is such a powerful way to enter peoples homes. There has been increased demand on my time because of speaking requests to groups and businesses. However, most of the time I am able to have my very capable Master Gardener volunteers fill those requests. While the shows are home garden related, I do try to bring about an awareness of other programs in UCCE and extend current research that might have applicability to home horticulture.

At the Garden of the Sun, we have been able to offer over 64 classes in 1995. Our classes have been financially self-sustaining and at the same time provided hands-on information to our clientele. We have, as a result of our classes, been able to develop a partnership with the solid waste management division in the county to help support composting classes. They pay for their clients to attend our classes. Their support helps us reach our affirmative action goal of providing low cost classes to families and underserved clientele who may need them. As well, we have been able to utilize the "hands-on" character of the garden so that people learn more by doing and participating and the classes also help to provide some of the physical labor to keep the garden in shape.

**Research**

My research activities are all directed at developing methods of sustainable landscape practices that also reflect the goals behind IPM. My research is done in conjunction with specialists, other advisors and with clientele/cooperators in the region. Two research projects are articulated below.

Silver Leaf Whitefly Ornamental Host Range

Justification

Infestations of silver leaf whitefly (SLWF) have been recorded in the region and their impact on agriculture is significant. It is felt by entomologists that the overwintering populations in rural areas are due to ornamental host plant material availability in protected areas around homes. The literature however, was cloudy as to the exact host range of SLWF in the various species of ornamentals in the same family. For example the literature says "jasmines" are hosts. However, there are a multitude of plants with the common name jasmine which are in different plant families. The objective of this project is to articulate which ornamental species are host plants and which support SLWF reproduction.

Results and Impact

We were able to clear up confusion about SLWF host susceptibility and most importantly we also able to note which ornamental species were not hosts. This is particularly valuable to large landscape managers such as Cal Trans in avoiding planting susceptible species over large

areas. The results of this trial have been published in Pan Pacific Entomology and in a UCCE Resource and Reference on SLWF. I have also presented the data to Cal Trans, California Association of Nurserymen and other large landscape management organizations.

Acorn Suppression in Southern Live Oak

Justification

Oaks are important landscape and woodland trees. However, because of heavy acorn production, they are often removed to avoid personal hazard from either vertebrate pests attracted to the acorns or from slip and falls. If there were ways to avoid the development of acorns, we could encourage saving the old oaks from removal. The objective of this project is to evaluate the efficacy of two growth regulator products on the suppression of acorns.

Results and Impact

We evaluated not only the materials on the suppression of acorns but the impact on leaf quality as well. We found that one of the materials, NAA did suppress acorn production but so heavily impacted the foliage, causing epinasty and necrosis, to make its use unlikely. Ethephon, however, did provide good acorn suppression and had no impact on leaf quality. I have submitted the results to the J. of Arboriculture for publication and presented the data at the 1996 Western Plant Growth Regulator Society. We have also shown that a product, which UAP had hoped to register, to be inappropriate for this use.

**Publications**

Scientific Peer-reviewed

Elam, Pamela M. and J. Baker. 1995. Acorn Suppression with Ethephon and NAA. Submitted and accepted for publication in J. of Arboriculture.

Summers, C., P. Elam,. 1995. Silver Leaf Whitefly Ornamental Host Preferences. Pan Pacific Entomology.

Scientific Non-peer-Reviewed

Elam, Pamela, 1995 Plant Growth Regulators and Their Effect on Rooting in Newly Sodded Turf. Western Plant Growth Regulator Society 7th Annual Conference Proceedings.

Lindsey, Patricia, J. Lichter, P. Elam, D. Giraud, R. Harris, J. Hartin, G. Hickman, R. Molinar, E. Perry, D. Pittenger. 1994-95. Designing and Establishing Successful Woody Landscapes-A Manual for Landscape Architects and other Landscape Professionals.

County/Regional Leaflets

Elam, P. Home Vegetable Gardening, a Resource Directory, 1995

Elam, P. Vermicomposting, A Teachers Guide, 1995

Newsletters

Elam, P. 1995, Planting Under Oaks, ASLA Newsletter, Summer edition. CCTLC Newsletter, Spring 1995

Elam, P. 1995, Redwoods in Central Valley Gardens, CCTLC Newsletter, Summer edition.

*Mark W. Freeman, MS*
Farm Advisor - Citrus, Nut Crops, Olives, Caneberries

Years Serving Fresno County: 15

**Program**

I extend information and conduct applied research to solve local problems with nut, citrus, olive, and caneberry crops. Growers and allied industry personnel are made aware of and encouraged to adopt the most efficient methods to produce and harvest those crops. These efforts are accomplished through written articles, phone calls, meetings, short courses, television and radio, cost studies, and farm visits. In addition, I work with people from U.C. and other agencies to combine efforts in solving problems and extending information.

**Situation Statement**

My two major crop responsibilities are almonds and citrus. In Fresno County, there are 43,000 acres of bearing almonds which are largely planted near Kerman, Caruthers, and the West Side. Acreage planted to almonds in Fresno is increasing rapidly because of the higher value of almonds and the more favorable growing conditions (compared to the Sacramento Valley). Major industry concerns include variety and rootstock selection, control of bloom diseases, and water availability/quality. Citrus is mostly planted closer to the Sierra Nevada mountains in areas like Clovis, Sanger, and Orange Cove. Navels, valencias, and lemon trees comprise most of the 25,000 acres due to established markets for these fruit. The total acreage has remained fairly static due to extremely competitive markets during the last five years. Because of those market conditions, growers are concerned about producing large fruit of "export" quality for the best returns. In addition, there is demand for any information to lower costs or increase yields. There is much interest in growing other citrus such as mandarins or Pummelo grapefruit, but that acreage will only increase as fast as markets can expand.

Pistachio acreage is increasing on the West Side but growers are experiencing many problems as the industry is fairly young. Acreage of olive, pecan, and caneberry is fairly stable because of competitive markets. Walnut acreage has increased slightly because of favorable markets in the last few years, but expansion is probably limited in Fresno by the lack of deep clay loam soils.

**Research**

Almond Variety/Rootstock Trials

The choice of almond varieties and a rootstock is of critical importance because those choices, once made, essentially will not change for the life of the orchard. In Fresno, I was responsible for a regional variety trial and a two rootstock trials which are finishing after ten years. Statewide, there were five variety plots and three rootstock plots. Data from all the trials have been presented at local and statewide grower meetings, included in the new statewide "Almond Orchard Manual", and used in numerous articles by the agricultural press. Locally, the almond yield per acre has increased about 500 pounds per acre during the last 12 years, and much of that increase is due to variety selection and knowledge about growing specific varieties.

Citrus Ground Floor Management/Root Health

The citrus industry is well established in the valley, with some orchards over 80 years old and still producing viable crops. Since the 1950's, irrigation practices have changed drastically from using furrows to now using

pressurized low volume systems. However, some practices and problems have not changed such as the usage of herbicide sprays over the whole orchard floor to control all weed growth and rates of nitrogen application. There are concerns about some herbicides reaching the ground water, water penetration through bare soils, poor root health, excessive nitrogen levels in soil and water, and the resultant effect on tree growth and yields.

The local farm advisors have received research and educational grants to investigate the potential problems, identify possible solutions, and extend that information to the industry. Currently, the market situation that growers face is not favorable. They must produce higher yields of large fruit with excellent quality for the export and domestic markets to stay in business. Much of the citrus research and education during the past ten years has focused on practices above the ground. Now, we will focus on the effect of root diseases, nematodes, irrigation practices, herbicides, and weeds on tree health, root growth, and crop quality and yields. A number of citrus researchers from UC Riverside and Davis will be assisting with the projects along with other agencies. Two of the three sites are located in Fresno County. In addition, we will be cooperating with the industry on ways to present information to growers and survey current practices and future changes due to our educational and research efforts.

Pocket Gopher Control

Pocket gophers affect much of the agricultural acreage in Fresno County. These below ground pests can damage or kill plants, cause unwanted soil movement, and re-direct irrigation water. Locally, we are evaluating the possible effects of barn owls on gopher populations. It is a very difficult item to measure as both the owls and gophers are quite mobile. However, there is much interest in promotion of predatory birds in agricultural areas even if there is minimal effect on vertebrate pests. Currently, we are developing an educational manual for growers on how to attract and maintain barn owls through nesting boxes. We received funding from a federal grant to write a manual about predatory birds of California with an emphasis on agricultural areas. We are also cooperating with the agricultural commissioner's office on local educational and applied research projects needed on vertebrate pests. Currently, thousands of dollars are spent in Fresno to control gophers through baiting and trapping. In addition, gophers easily cause tens of thousands of dollars damage to tree crops each year. Our goal is to educate people regarding the correct and efficient usage of current control techniques, and to investigate possible alternative controls.

**Education**

Meetings

An almond breakfast meeting is held twice a month for six months and then once a month for the remainder of the year. A regional almond day is held once a year during the winter. Two citrus meetings are held in conjunction with the Tulare County farm advisor, one regional walnut day is held in Visalia, and statewide pistachio and olive days are organized with other farm advisors. In 1995, I spoke at two U.C. short courses, walnuts (at UC, Davis) and pistachio (Fresno). I organized a special meeting about vertebrate pest control which featured our cooperative efforts on studies of barn owls to control pocket gophers. Over 100 people attended that meeting. In addition, I gave educational presentations to commodity research boards, community groups, grower groups, and other governmental agencies.

Newsletters and Statewide Publications

I write two newsletters for growers, one on nut trees and one for citrus and olive production. I am a contributor to a statewide citrus newsletter which won the 1995 American Society for Horticultural Science educational award. I organized and help write an educational brochure on identifying ants which was distributed to over 10,000 people working with citrus and

almonds. A pistachio manual was published in 1995 in which I wrote two chapters. Currently, I am in charge of developing a statewide citrus orchard manual.

Mass Media

I write a monthly column for "Pacific Nut Producer" on almond production and in 1996 will write a similar column on citrus for "Citrograph" magazine. In 1995, I started working with KMPH television station and produce four weekly updates on almond, citrus, olive, and pistachio. Those updates are shown on the morning agricultural show (at 5:30 a.m.) and also simultaneously broadcast on the radio show. We have a phone in system called AgLine which offers weekly updates on irrigation (seven messages), tree crop insect control, and tree crop updates (four messages). This system is powered by a computer but is accessible by touch tone phones.

Farm Visits and Phone Calls

Most of my "educational" time is spent answering specific requests for help or visiting sites to solve/diagnose problems and offer solutions. I regularly travel from Coalinga to Orange Cove to help agricultural clientele when requested, and bring in UC personnel and other resources when needed to cooperatively develop solutions. Because of this link to expertise within UC and other agencies, I help growers save money due to unnecessary practices or improve production and quality. When making clientele aware of the situation and then assisting them to adopt new practices, there are tremendous savings over many years.

**Clientele Served**

My primary clientele are growers and allied industry personnel that work with these growers. There are about 2000 people within those groups. In addition, I work with people from many different governmental and private agencies that call for assistance or offer possibilities for cooperative efforts to serve my primary clientele.

**Publications**

The biggest demand for written information is supplied by our local publications. Our cost studies are used extensively by growers, bankers, appraisers, etc. Our pest management manuals are used by pest control advisors, growers, etc. I write or update many publications such as "monthly calendars of operations" for specific crops.

*Kurt J. Hembree, MS*
Farm Advisor - Vegetation Management

Years Serving Fresno County: 1

## Program

In 1995, there were more than 200 different commodities grown in Fresno County on over two million acres with an estimated value of $3 billion. Undoubtedly, vegetation management (weed control) had a major impact on each acre of production, costing growers millions of dollars to control using herbicides, cultivation, handweeding, sanitation, and other techniques. In many instances, costs associated with managing weeds can account for 20% or more of the total cost of growing the crops. There are currently 254 registered pest control advisors (PCA's) in Fresno County, most of whom have responsibilities in several crops and with several growers.

The major responsibilities of my position is to plan, coordinate, implement, and evaluate a program designed to provide PCA's with current, accurate information regarding weed control strategies available. Extending research-based information to the clientele was carried out in 1995 through several means, including personal consultations, at various meeting sites, at commodity sponsored events, and in a newsletter I recently published called "Vegetation Management News." My affirmative action program is an integral part of my research and education program. In 1995, I also presented information relevant to home gard weed control at California State University Fresno and at the Discovery Center, Garden of the Sun.

## Situation Statement

Conduct applied research studies designed to develop possible solutions to specific crop/weed problems growers commonly encounter.

## Research

### Postemergence Weed Control in Cotton

*Solanum nigrum* (black nightshade) is one of the most troublesome weeds to eradicate in cotton in the central San Joaquin Valley, costing growers up to $200 per acre to control with herbicides, cultivation, and handweeding. A sulfonylurea-like herbicide (Staple®), applied at low rates (1.2 to 2.8 oz/acre) was shown to provide effective control of black nightshade and other summer annual weeds. As a result of this and other studies conducted over the past six years, Staple was labeled for use in cotton in California in 1996. This will help growers to save $100 or more per acre over past control options.

### Preemergence and Postemergence Weed Control in Tomatoes

Because black nightshade is in the same family (potato) as processing tomatoes, there are no currently labeled herbicides that can be used to selectively control nightshade weeds in tomatoes. Fields with nightshade weeds at a population of 1 plant every three feet of row can lead to a yield loss of 13% or more; therefore, these weeds must be controlled. As a result, growers will spend up to $300 per acre to handweed nightshade from infested fields. In 1995, four studies were conducted to determine the effects of a new herbicide (E9636) on nightshade control in processing tomatoes. The results showed 92 to 98% nightshade control when E9636 was applied following planting and sprinkler irrigated at 1 to 2 oz/acre. Tomato growth was excellent and yields were not negatively impacted; however, E9636, applied postemergence, did not effectively control nightshade. The results from the study have stimulated interest statewide for trials to be continued in 1996. Results were shared at various

tomato field meetings with growers and PCA's and in Vegetation Management News.

Postemergence Weed Control in Sugar Beets

There are no currently registered herbicides that will control *Abutilon theophrasti* (velvetleaf) in sugar beets. Although not widespread, it can cost growers up to $200 per acre to control through cultivation and handweeding. Four studies were conducted to determine if velvetleaf could be controlled postemergence with UpBeet® (a new sulfonylurea herbicide). The studies clearly demonstrated that UpBeet provided effective velvetleaf control without impacting yields or sugar content of the beets. Results were presented at a sugar beet workgroup in Davis in January 1996 and in a newsletter. Similar studies are being conducted in 1996.

New Technology for Weed Control

Several studies were conducted in 1995 to determine the effectiveness of a new sprayer technology to reduce the total input of postemergence herbicides in annual and perennial crops. This new technology utilizes a light source that allows the sprayer to discharge the herbicide only when it "sees" green plants. As a result, the herbicide was deposited only on weeds and not on bare soil. The results from the studies showed that the WeedSeeker® sprayer reduced postemergence herbicide usage by as much as 70 to 80% when weed presence was low (5 to 15% cover) at the time of application. The results were so favorable that University of California researchers have highly recommended the equipment for California growers.

Extending Biologically Integrated Farming Practices Within the San Joaquin Valley's West Side

Beginning in 1995, a three-year project was developed by University of California researchers, including myself, with 20 farm locations on the west side of the San Joaquin Valley to develop strategies for introducing cover crops and/or mulches into the various crop rotations to build soil organic matter. The study was designed to answer basic questions as related to effects of the various organic amendments on soil fertility, pest populations, and other crop production parameters. Thus far, the project has stimulated numerous on-site demonstrations which proved to be of interest to growers.

**Clientele Served**

My primary clientele include all PCA's in Fresno County, of which there are 254 registered. In addition, I work with large and limited acreage growers and home landscapers and gardeners. I work with people from many different governmental and private agencies that call for assistance or offer possibilities for cooperative eforts to serve my primary clientele.

**Publications**

Newsletter

Hembree, K. J. 1995. Vegetation Management News - a periodic newsletter focusing on weed identification and biology, current research, changes in herbicide registration, and other information devoted to weed control in Fresno County.

Popular Press

Hembree, K. J. 1996. Importance of weed monitoring to weed management decisions. Proceedings, CWSS. No. 48, pp. 48-50.

Hembree, K. J. and M. LeStrange. 1996. Weed control in brassicas. Proceedings, CWSS. No. 48, pp. 86-91.

Hembree, K. J. 1995. Vegetation management in pistachio orchards. Pistachio Production Manual, 1995. University of California, pp. 63-70.

Prather, T. S., K. J. Hembree, and M. LeStrange. 1995. Nutsedge control by deep plowing. SJV Vegetable Crops Report. UCCE, Vol. 1, No. 1.

Hembree, K. J. 1995. Using herbicides for weed control in broccoli. SJV Vegetable Crops Report. UCCE, Vol. 1, No. 2.

Hembree, K. J. 1995. Vegetation management in alfalfa and corn. 21st Century Dairying Newsletter. UCCE, Fresno and Madera Counties, pp. 1-3.

Hembree, K. J. and T. S. Prather. 1995. Deep plowing for yellow nutsedge control. Proceedings, WSWS. No. 48, pp. 59-60.

Prather, T. S. and K. J. Hembree. 1995. Determining the economic impact of weed control in iceberg lettuce using varied rates of Kerb in combination with hand hoeing. Plant Protection Quarterly. UC DANR, Vol. 5, No. 3, pp. 1-3.

Hembree, K. J. and B. B. Fischer. 1995. Use of synthetic mulches for weed control. Proceedings, CWSS. No. 47, pp. 63-64.

Hembree, K. J. 1995. Achieving successful weed control using varied methods of applying metham. Proceedings, CWSS. No. 47, pp. 107-109.

*Gerald E. Higginbotham, Ph.D.*
Farm Advisor - Dairy and Silage
Fresno and Madera County

Years Serving Fresno County: 7

**Program**

The Central Valley currently has approximately 800,000 dairy cows. The dairy cow population for the state is 1.2 million, with the Central Valley accounting for approximately 65% of the state's production of milk. Locally, the dairy industry is experiencing steady growth. Currently, there are approximately 118 dairies in Fresno County with cow numbers approaching 75,000. Gross returns from milk rank fifth in Fresno County with a value of $170 million.

Urban sprawl in the Southern California dairy sheds has resulted in some of these dairies to relocate to the Fresno County area. The local area is attractive with relatively low land prices, high availability of dairy feed and labor supply. With increased relocation of dairies from Southern California, the local economy will grow due to dairy services and employment opportunities.

My assignment with the University of California Cooperative Extension Service includes responsibility for dairy, dairy goats, and silage in the counties of Fresno and Madera. The major aspect of my job is to plan, coordinate, implement, and evaluate an integrated program of education and applied problem solving research for dairy producers and dairy allied industries.

Educational programs include classroom and field meetings, personal farm visits, newsletters, trade publication articles, news releases, and radio and television interviews. Problem-solving research programs are planned and done according to my assessment of needs of dairy producers, dairy suppliers, milk processors, and silage growers. All aspects of my job are done with consideration of needs of minority and ethnic clientele.

**Situation Statement**

Feed for dairy cows ranges from 50 to 60 percent of the total costs on a dairy farm. Because of this, even a small percentage decrease in feed costs represents large savings on the dairy. Dairy producers are continuously looking for mechanisms by which they may either increase feed utilization and/or feed costs.

Another concern for dairy producers is the handling of dairy manure. Dairy waste management is gaining greater attention from regulatory personnel in order to prevent contamination of underlying groundwater. Dairy waste nutrient management is gaining greater attention from individuals who advise growers and producers and from growers and producers themselves. In some situations, costs can be reduced by managing nutrients more effectively. Unfortunately, few data are available to determine appropriate methods to calculate nutrient application rates for both dry and liquid manure. Research in the area of manure management is a critical need of the San Joaquin Valley dairy industry.

**Research**

Monitoring manure water pre-irrigations in Central Valley Dairy operations

Funded by: Regional Water Quality Control Board

The 1.2 million dairy cows in the state excrete 100,000 tons of manure daily and if

mismanaged can adversely impact our surface and groundwater resources. New legislation requires farmers record nutrient applications on farm land and apply nutrients at proper times and rates to manage potential contamination of ground or surface waters. Unfortunately, few data are available to determine appropriate methods to calculate nutrient application rates of both dry and liquid manure.

To help determine the proper application rates of manure on cropland, an ongoing study is being conducted by University of California Cooperative Extension on a Fresno County dairy. The results from this study will help determine the variability of manure nutrient content when applied through irrigations. This will also help to determine how frequent samples must be taken during irrigations to estimate application and prevent overloading of nutrients.

The information will be quite useful to dairy producers in the County to minimize potential long term adverse effects of manure water application to the land.

Performance and behavior of dairy calves using different types of commercial housing

Funded by: L. T. Hampel Corp.

The environment plays a key role in the perpetuation of diseases in calves. Environmental extremes of cold or heat decrease disease resistance in dairy calves. Diseased calves generally require more medical attention thus increasing a dairy producer's cost of production. Improved environmental management of dairy calves may alleviate some of the problems associated with environmental stress. On most Fresno County dairies, calves are grouped individually up to 60 days of life in wooden hutches that are 4' x 8' x 4' high. Such housing provides environmental protection, helps prevent spread of disease, and facilitates the detection and treatment of sick calves.

Recently, different types of calf housing have been made available to Fresno County dairy producers. These housing systems utilize fiberglass or polyethylene in their designs, unlike the traditional wooden hutches.

There is little information available on these types of calf housing in order for dairy producers to make an educated decision on which system to purchase. For this reason, I initiated a trial on a Fresno County dairy where I evaluated three types of calf housing, namely, a wooden calf hutch, a polyethylene hutch and a polymer hutch. Parameters measured included calf growth and health, environmental conditions within the hutch and behavior of calves in the different calf raising systems.

Results gained from this trial will allow local dairymen to make calf housing purchasing decisions based on local research information.

Effect of Propionic Acid Producing Bacteria on Corn Silage Fermentation

Funded by: Lallemand, Inc.

Corn silage is a major forage source for dairy producers in Fresno County. The success of the silage fermentation process depends on the fermentation of plant sugars by lactic acid bacteria and on the lowering of the silage pH to a level that inhibits further biological activity. Failure to have proper silage fermentation will lower forage quality which reduces feed intake and animal performance.

Recently, propionic acid producing bacteria have been explored as a silage additive. In the silage mass, propionates may reduce the dry matter and energy losses associated with the infiltration of oxygen, by lowering the activity of yeasts, molds, aerobic bacteria, and plant respiration. Propionates also reduce silo temperatures, which is turn reduces protein solubilization and heat damage and increases bunk life.

Many questions are directed towards Cooperative Extension staff concerning the merits of silage additives especially concerning corn silage. There is limited data

concerning the efficacy of silage inoculants namely those which produce propionic acid. Of particular importance is the question of silage stability once exposed to air.

A recently completed experiment determined if the addition of propionic bacteria would enhance the fermentation of corn silage. Aerobic stability of silage once exposed to ambient temperatures was also examined.

**Educational Activities**

Meetings

January 1995:
Helped organize the annual South Valley Dairy Day which was held in Riverdale, California. I presented a talk entitled *Effect of Adding Fiber Digesting Enzymes to a TMR.*

October 1995:
Organized a meeting centering on dairy waste management in Riverdale.

**Publications**

Newsletter

I publish a semimonthly newsletter entitled *21st Century Dairying.* In addition, I co-publish a dairy goat newsletter entitled *Tri County Goat Newsletter.*

Popular Press

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Higginbotham, G. E. 1995. Feeding management incentives. *In* Employee Incentive Pay in Dairies. Third edition. University of California Agricultural Extension.

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*Don May, MS*
Farm Advisor - Vegetable Crops

Serving Fresno County: 30 Years

**Program**

My crop responsibility is vegetable crops in Fresno County. This includes a wide array of vegetables, representing most vegetables that are grown in California. The major acreage and values are in processing and fresh market tomatoes, melons, head lettuce, garlic and onions, broccoli and peppers. There are ten major acreage vegetables, but, over 50 miscellaneous types of vegetables are grown in Fresno County. Each of these different crops is important to the grower. I conduct applied research and an education program for vegetable growers and allied vegetable industries.

**Situation Statement**

Vegetable crops have consistently increased in acreage and value since the early 1960's on the west side of Fresno County, with acreage increasing from 40,000 to 230,000 in 1995, and value rising from $29 million to $734 million. As water and land costs increase, vegetables are the major crops that result in high enough returns to profitably pay these increased costs. Vegetable production, packing, and processing also support a large labor force in Fresno County. Below are four of my many projects that are having a significant impact in Fresno County.

**Research**

Drip Irrigation Reduces Water Need, But Fruit Quality Is A Problem To Processing Tomato Processors

Processing tomatoes are a major vegetable crop on the west side of Fresno County, with over 100,000 acres producing a crop valued at over $200 million. Growers have tried for ten years, with poor success, to use drip irrigation to conserve costly water. Yields have been excellent, but fruit quality for the processor has been very poor. Therefore, some processors have refused to contract drip irrigated tomatoes. Growers have tried the same methods and practices used in furrow irrigation on tomatoes, but they either did not achieve the desired percent solids and/or resulted in excessive losses from sunburn and sun scaled fruit, which reduces both quality and yield.

This research, started in 1992, found that by starting mild stress 60 days before harvest instead of severe stress 30 days before harvest, as used in furrow irrigation, resulted in better yield than furrow irrigation and equalled or bettered the percent solids. We are now working with growers using drip irrigation to implement these practices so that processors will allow increased acreage of drip irrigated tomatoes.

This research will be more valuable to Fresno County agriculture as water availability and costs continue to increase. Use of drip irrigation will also reduce the need for on-farm drainage of saline water, a significant problem for west side agriculture. The ability to put a dollar value on this type of research is very speculative, but the savings to growers, etc., would be substantial over the years to come.

New Varieties of Vegetables Increase Grower Profits Substantially

Research variety trials of tomatoes, melons, sweet corn, and onions have been traditionally conducted at the West Side Research and Extension Center and in grower fields each year. Annually, 120 to 150 new cultivars are evaluated at the Center. A major component of a successful variety is high yield. Good fruit quality is equally important to the food processor and

consumer. These additional factors are also evaluated.

The concentration of the large number of new varieties of important vegetables each year in small trials at the field station and on grower fields develop unbiased data that growers can analyze. Then growers and/or processors can take the best new varieties and plant them in a small grower trial to see how they perform under their field conditions. This type of information helps to keep Fresno County vegetable profits and acreage increasing each year.

Tomato yields over the past 30 years have gone from 20 tons/acre to over 40 tons/acre. A significant portion of this increase can be attributed to better varieties. This can be substantiated by variety trial yields on the same soil and cultural practices over the years at the West Side Research and Extension Center. This increase in tons/acre also means an increased return to the growers of over $1,000 per acre. This is what allows growers to use higher cost water, fertilizer, and labor, and still be competitive in the global market for tomato paste.

Use Of Plastic To Reduce High Cost Hybrid Seed

Trials have been conducted for the last two years at the West Side Research and Extension Center and on grower fields to reduce seeding rates and protect low plant density plantings. Using a narrow .8 ml plastic sheet 18" wide, and placing seed at the bottom of a 3 to 4-inch deep furrow, has resulted in 90% germination and protected the young seedlings from bird damage (feeding on the young plants is sometimes the only vegetation available in early February).

New hybrid seed varieties of both tomatoes and cantaloupe have significantly increased yield, fruit quality, and disease resistance over the previously used open-pollinated varieties. Generally, yields are 20% to 25% higher. More disease and insect resistance reduces use of fungicides and pesticides, and increases fruit quality for the consumer.

With all the above advantages, seed costs have increased 10 to 15 times. This has forced growers to substantially reduce seeding rates, resulting in both higher costs for seed and more risk for poor stands; and, sometimes, complete loss of the seedlings, which requires increased costs to replant.

Reducing the seeding rates of hybrid tomatoes from .5# to .1# (seed costing $300/#), the grower saves $120 per acre. The cost to buy, apply and dispose of the plastic is approximately $75/acre. This can save the grower $45/acre and insure a good tomato stand.

Planting on over 100,000 acres of tomatoes or 37,000 acres of melon each year in Fresno County, this practice will result in significant savings for the growers.

Storing Tomatoes In The Field Instead Of The Cannery

Tomato yields on the west side of Fresno County for a July or August harvest will average 45 to 50 tons/acre. Yields during the September harvest can be reduced to 18 to 25 tons/acre. This reduced yield is caused by the high temperatures from July 10 to August 10 resulting in poor fruit set.

During the past 15 years there have been eight new canners that have located in Fresno County or adjacent areas. Thus they must either force through negotiations with growers for growing early acreage or the canner must pay the increased fruit costs from the northern tomato growing districts.

A trial was established at the West Side Research and Extension Center in 1995 with 24 varieties that have especially firm fruit. The first harvest was on August 23 when the fruit was over 90% ripe. A portion of the plots were harvested weekly until September 25.

Five varieties suffered only 10% yield loss and little fruit quality loss while other varieties suffered 50% yield and quality losses. A trial planted 30 days later to set fruit during the high temperature period and harvested in September resulted in 25

varieties yielding one-third less than the best variety in the field holding trial with poorer fruit quality.

This late acreage is approximately 20% of the acreage grown in the County each year and would increase if yields could be increased. An increased yield of 10 tons/acre would increase grower income $500/acre, or would mean 20,000 acres of tomatoes could be grown in Fresno County profitably for a September harvest.

**Educational Activities**

I have attended the following meetings to present pertinent information learned from research trial results:

Jan. 1995
Tomato Day, UC Davis

Jan, 1995
Processing Tomato Meeting, Davis

April 1995
4th National Symposium on Stand Establishment of Horticultural Crops, Monterey

July 1995
92nd ASHS Annual Meeting, Montreal, Canada

Sept. 1995
Tomato Breeders Meeting, Davis

Sept. 1995
Heinz Tomato Day, Tracy

Sept. 1995
Sustainable Ag. Meeting, Davis

Sept. 1995
Tomato Round Table, Davis

Nov. 1995
Processing Tomato Conference, Asilomar

Nov. 1995
Processing Tomato Meeting, Modesto

Dec. 1995
Vegetable Conference, Davis

Dec. 1995
California Tomato Research Institute Meeting, Davis

I have also attended numerous grower meetings to present or observe results of pertinent research, including:

Tomato and Melon Days at the West Side Research and Extension Center, in Five Points, CA, in July, 1995.

Grower meetings on processing tomato production at the West Side Center.

Grower drip irrigation meeting in Visalia.

**Publications**

Peer Reviewed-Scientific

Shennan, Grattan, May, et.al., "Feasibility of Cyclic Reuse of Saline Drainage in a Tomato-Cotton Rotation." Journal of Enviromental Quality, 1995.

Newsletter

Dec. 1995
1995 Vegetable Highlights

*Richard Molinar, MA*
Farm Advisor - Small Farm and Specialty Vegetables

Serving Fresno County - 10 months

**Program**

My appointment in Fresno County started September 1, 1995 . Much of my time in the first months was spent visiting farmers around the county to discuss their problems and ascertain needs in the areas of research and education.

The Small Farm/ Specialty Vegetable position in Fresno County works with operations classified as 'Small Farm', those which gross less than $100,000 per year, and/or who raise specialty, high cash value vegetable crops. Specialty crops include many of the S.E. Asian crops such as bittermelon, moqua, sinqua, daikon, and lemongrass, as well as strawberries, eggplants, peppers, cherry tomatoes, squash, basil, parsley, and others. Fifty percent (or 3,557 -more than any other county in the state) of all farms in Fresno are classified as 'small farm'.

My research focus is on the pest management problems faced by specialty crop and limited resource farmers. Equally important are the educational needs of this clientele, which are extremely variable, ranging from very basic education of soils, botany, cultural practices, and pest management, to more refined hi-tech information.

**Situation Statement**

Fresno County has more diversity in its 'Specialty Vegetable Crops' than any other county in California. Because of the nature of pesticide registrations and the EPA re-registration process, there are very limited pest controls for farmers raising these kinds of crops. Researching what is registered and making that information available to farmers is a high priority. Also, initiating processes to pursue registrations through "section 24" or "IR-4" programs through the state and federal governments will be evaluated.

Fresno County also has more diversity in clientele ethnicity than any other county in California. According to the 1992 Ag Census, Fresno County leads in the number of Hispanic, S.E. Asian, and Black farmers, most of whom are raising the above-mentioned specialty crops. The S.E. Asians in particular are a very recent group to arrive in Fresno (late 1970's), and besides lacking much of the basic knowledge of plant nutrition, soil care, and pest management, they also have a significant language barrier. They are a very hard-working group, often times involving the whole extended family, but their educational needs are critically high.

**Research**

<u>Evaluation of 6 varieties of strawberries adapted to Fresno County and the San Joaquin Valley</u>

Most of the strawberries grown here are for processing and 15-20% for fresh market roadside stands. Research is needed to look at newer varieties for production here as well as at the cultural techniques used by the growers - most of which are S.E. Asian Hmong. Recent developments in several newer varieties, particularly the Camarosa variety, may have potential impact for higher yields of strawberries in the county. Two late plantings in November and December were made with the 6 varieties. Measurements of yield, plant vigor, and pest problems will be used to evaluate their potential for this area.

**ducational Activities**

September to December, 1995: A significant amount of my time was spent as a committee chair for the statewide 1996 *California Farm Conference - Food and Wine Tasting* held in Visalia, California. We had 26 exhibitors of Central Valley Agriculture "Specialty Crops" including Ostrich tacos, Emu meatballs, hand stuffed olives, edible flowers, and more. 350 people attended the conference.

September, 1995: Spoke at the Fresno Adult School about opportunities in growing specialty crops.

October, 1995: Gave a tour of Fresno County agriculture to several representatives from the Ministry of Agriculture in Israel.

November, 1995: Helped organize and spoke at a 'Eggplant' growers meeting about cultural practices and pest management.

December, 1995: Spoke at a Veg Crops Conference in Davis about Specialty Crops in Fresno County.

December, 1995: Helped organize and spoke at a "Green Bean" growers meeting about cultural practices and pest management.

December, 1995: Set up a table for 2 days to answer questions and distribute information at the Hmong National New Year celebration at the Fresno fairgrounds. We received many questions and comments about our program in the county and about the mushroom display we designed.

Radio

November 27, 1995 (KBIF radio) -Served as a guest on a Hmong station for the San Joaquin Valley. Listener call-in to answer agricultural and pest management questions for 1 hour.

**Clientele Served**

Most of my clientele are the 3,557 "small" farm operations in Fresno County, (1992 Ag Census). Most of these raise specialty crops, have limited acreage/resources, and education. I also work with PCA's, PCO's who work with these farmers, lending institutions, packing houses, chemical supply houses, and other governmental agencies.

**Publications**

C.S. Koehler, L..W. Barclay, R.H. Molinar, "An Introduction to Entomology". A Training Guide for CA Master Gardener Syllabus, 1995, 25 pp.

Newsletter

Molinar, R. "Central Valley Specialty Vegetables."

*Shannon Mueller, Ph.D.*
Farm Advisor - Agronomy

Years Serving Fresno County: 8

**Program**

The Agronomy program addresses the educational and applied research needs of producers of alfalfa hay, seed alfalfa, oil crops, sugar beets, and dry beans. I keep clientele informed of the safest and most efficient means of managing physical and biological variables involved in producing their commodities to obtain economically optimum yields of high quality products. I also work with area beekeepers. I assist the California Alfalfa Seed Production Research Board, Dry Bean Advisory Board, Sugar Beet Industry, and the California Crop Improvement Association in communicating needs between various industries and the University of California.

**Situation Statement**

The acreage and diversity of agronomic crops in Fresno County makes it a challenge to develop innovative applied research and extension programs. Many of the crops handled in my program are minor crops, and access to resources and information is limited. There is not a well-developed allied industry for these crops, so growers rely heavily on information from Cooperative Extension. In order to work most efficiently, advisors from adjacent counties commonly work together to develop information, with each of us being recognized for distinct specialties. Major concerns typically involve pest control in minor crops, since few materials are registered for use in California. Optimizing yield and quality through changes in cultural practices are critical because the profit margin is narrow for most of these commodities.

**Research**

*Project:* Alfalfa Hay Quality Management

There is great demand for high quality alfalfa to meet the needs of dairy operators in California. However, alfalfa yield and quality are inversely related, so growers managing for high quality must harvest early and accept lower yields. A field technique is needed to enable growers to determine the best time to harvest to maximize yield and quality. If changing the time alfalfa is harvested results in even a small change in quality, a grower might receive $50-100 more per acre over the course of a year.

During the past three years, alfalfa samples were collected from area hay fields. Maturity was precisely determined as was the length of the longest stem and number of internodes. Samples were analyzed to determine quality components. This information is being used to develop prediction equations based upon alfalfa maturity which will assist growers in better scheduling harvest operations.

In 1995, a second trial was conducted to determine whether there are significant diurnal changes in forage quality. If so, scheduling harvest operations late in the day instead of early in the morning might result in a higher quality forage. During two harvest cycles, samples were collected every two hours for a 24-hour period. Chemical evaluation will determine whether quality differences exist, and whether they can be captured in preserved forages, or whether they are lost during the curing process.

*Project:* Leafcutter Bee Diapause Induction
*Funding Agency:* CA Alfalfa Seed Prod. Research Board
*Cooperators:* Bill Stephen (Oregon State University) and Darrell Silveira (Fresno Co. Grower)

Leafcutter bees are being used in the Central San Joaquin Valley on a limited basis to pollinate alfalfa seed fields. I believe their use will increase with the arrival of the Africanized Honey Bee, and if strategies are developed to make them more economical. One strategy we have tested for the past four years is the induction of diapause to save bees from one year to the next. This would result in a significant savings, since leafcutter bees cost between $100-$400 per acre, depending on availability.

During the 1995 production season, sample blocks containing immature bees were pulled when Degree Days (DD) totalled approximately 100, 120, or 140. Blocks were allowed to incubate at temperatures of 68, 72.5, 77, and 86°F for an additional period (25 - 40 DD) to allow all developing larvae to mature prior to placement at either 41 or 50°F for winter storage. The immature bees were x-rayed in January and are now being stored at 50°F . In May they will be x-rayed again and incubated to determine survival.

We have a sufficient number of different field DD exposures to show that 105-115 DD provides a near optimal field exposure. The treatment to which the bees are exposed following removal from the field is the most critical for diapause induction. Early x-rays showed that between 70-85% of all the cells in many treatments consisted of mature prepupae, the stage necessary for successful winter storage.

*Project:* Garbanzo Production Research
*Funding Agency:* Garbanzo Council Dry Bean Advisory Bd.

Commercial production of garbanzo beans in Fresno County has replaced a significant portion of the winter wheat and other cereal acreage as a winter crop. Production has increased from 20,000 sacks to over 300,000 sacks in the past five years. Growers in this area requested production information regarding stand establishment, fertilization, irrigation management, weed control, and disease control.

We have been conducting research for the past several years to generate information for area growers. Planting date, seeding rate, and row spacing trials indicate the best time to plant is November or December to obtain the highest yields. Preliminary data indicate a yield advantage from double rows on 40" beds. There was no significant effect of row spacing on seed size. Fertilization and irrigation research demonstrated that supplemental nitrogen fertilizer and/or additional irrigations result in a significant increase in bean yield. However, the size of the beans tended to be smaller when yields were higher. Several herbicide rates and combinations were evaluated to determine the level of weed control and the potential for phytotoxicity. There are a number of safe and effective materials registered for use on garbanzos, so growers can tailor their herbicide use to known problem weeds in the field. Ascochyta blight has become a serious disease in Valley garbanzo fields. We have learned that the disease can be controlled effectively with Bravo Weather Stik, maintaining yields 400 lbs/acre higher than those from untreated plots. Field days have been held annually to showcase research trials and discuss results with local growers.

**Highlights of Educational Activities**

**National Alfalfa Symposium,** Syracuse, NY, February 1995. Invited Speaker - *Growing Certified Alfalfa Seed.*

**CA Alfalfa Seed Production Symposium,** San Joaquin & Holtville, CA, March 1995. Planned program and invited speakers to present information on seed production for meetings in both locations. Presented information from my research on Capture Resistance Testing, Leafcutter Bee Diapause Induction Studies, and Dodder Control.

**Alfalfa Intensive Training Seminar,** St. Louis, MO, March 1995. Attended training and presented lecture on Alfalfa

Seed Production in the Western United States.

**Garbanzo Field Day,** West Side Research and Extension Center, May 1995. Organized tour in cooperation with Carol Frate (Tulare) and Bruce Roberts (Kings). Presented information on Plant and Row Spacing Trial and Herbicide Efficacy Evaluation.

**Blackeye Field Day,** Kearney Agricultural Center, August 1995. Organized tour in cooperation with Carol Frate (Tulare) to show breeding nurseries, lygus management studies, and nematode resistance screening.

**Alfalfa Field Day,** Kearney Agricultural Center, August 1995. Planned tour in cooperation with Carol Frate (Tulare) and invited speakers to present information on alfalfa varieties and production factors including stand establishment, weed control, harvest management, and quality evaluation. Presented demonstration of *Mean Stage by Count* maturity evaluation.

**Annual Dry Bean Workgroup Meeting,** Five Points, CA, November 1995. Organized presentation of summaries of all research conducted throughout the state on dry beans to university and industry representatives. Moderated discussion of research priorities for various bean types and invited speaker from S&W Foods to discuss industry requirements for canning quality.

**California Alfalfa Symposium,** Modesto, CA, December 1995. Served on the program planning committee and presented two talks: *Seed Production in the Western US - Commitment to Quality* and *Using a Cotton Module Builder for Alfalfa.*

**Clientele Served**

In addition to working with growers in Fresno County, I provide information to allied agricultural industries such as pest control advisors and other private consultants, students, teachers, agricultural products suppliers, seed companies, out-of-state growers, bankers, insurance companies, the media, libraries, county, state, and federal agencies, and other university and private researchers.

**Publications**

Scientific, Peer Reviewed

Higginbotham, G.E., S.C. Mueller, C.A. Collar, and T.A. Schultz, 1995. Effects of an Enzyme Addition on Corn Silage Fermentation. The Professional Animal Scientist 10:163-168.

Research Reports

Frate, C.A., S.C. Mueller, and B.A. Roberts, 1995. Garbanzo Ascochyta/Bravo Trial Report. pp. 107-108. In: University of California Dry Bean Research 1995 Progress Report.

Frate, C.A., S.C. Mueller, S.R. Temple, and L. Sanchez, 1995. 1995 Leafminer Control Trial in Blackeyes at the West Side Research and Extension Center. pp. 69-70. In: University of California Dry Bean Research 1995 Progress Report.

Mueller, S.C., C.A. Frate, and B.A. Roberts, 1995. Garbanzo Plant and Row Spacing Evaluation. pp. 98-99. In: University of California Dry Bean Research 1995 Progress Report.

Mueller, S.C. and K. Hembree. Garbanzo Bean Herbicide Trial, 1995. pp. 100-103. In: University of California Dry Bean Research 1995 Progress Report.

Roberts, B., A. Fulton, C. Frate, S.C. Mueller, and S. Temple, 1995. Evaluation of Nitrogen Fertilizer and Irrigation Management in Garbanzo Beans. pp. 109-111. In: UC Dry Bean Research 1995 Progress Report.

## Proceedings

Mueller, S.C., 1995. Alfalfa Seed Production in the Western U.S. - Commitment to Quality. pp. 36-40. In: Proceedings 25th California Alfalfa Symposium. Modesto, CA. Dec. 7-8, 1995.

Mueller, S.C., 1995. Alfalfa Seed Production Research Update. pp. 36-43. In: Proceedings Alfalfa Seed Production Symposium. San Joaquin & Holtville, CA. March 14-15, 1995.

Mueller, S.C., 1995. Growing Certified Alfalfa Seed. pp. 86-91. In: Proceedings 25th National Alfalfa Symposium. Syracuse, NY. February 27-28, 1995.

Mueller, S.C., 1995. Pollination with Leafcutter Bees - A Grower's Perspective. pp. 36-43. In: Proceedings Alfalfa Seed Production Symposium. San Joaquin, CA and Holtville, CA. March 14-15, 1995.

Mueller, S.C., J.H. Higginbotham, B. Hepner, G. Hepner, and G. Hepner, 1995. Using a Cotton Module Builder for Alfalfa. pp. 76-77. In: Proceedings 25th California Alfalfa Symposium. Modesto, CA. December 7-8, 1995.

Teuber, L., K.L. Taggard, L.K. Gibbs, and S.C. Mueller, 1995. Current Status of Research to Develop Genetic Resistance to Lygus Bugs and Evaluate Seed Yield Potential in Alfalfa. pp. 23-29. In: Proceedings Alfalfa Seed Production Symposium. San Joaquin, CA and Holtville, CA. March 14 and 15, 1995.

## Popular Press

Putnam, D., S.C. Mueller, E. DePeters, and B. Reed, 1995. Interpreting Your Hay Test Report. California Hay Testing Consortium publication. May 1995. UCCE Agronomy and Range Science Extension, Department of Agronomy and Range Science, Davis, CA.

## TV Interviews

*Africanized Honey Bees, Leafminer Control in Blackeyes, University of California Field Stations*, KMPH-TV, September 1995.

*Dan Munk, MS*
Farm Advisor - Soils/Water, Cotton

Serving Fresno County: 6 Years

**Program**

To work with cotton growers, their field persons, and advisors on sound and economical agronomic practices for the production, harvest, and marketing of their crops. To work with members of the agricultural community on water and soil concerns, which include questions on soil fertility, plant nutrition, irrigation scheduling, water quality, and drainage problems. I also prepare program information for the general public.

**Situation Statement**

There are over 320,000 acres of cotton grown in Fresno County with average production of over 1500 lbs. lint per acre - higher yields than all other U.S. counties in most years. Average farm size is nearly 2,000 acres, owned and operated as family businesses and partnerships. Programming needs to include the development of practical information for improved cotton production practices and a need to maintain industry awareness of the need for economical and efficient farm management decision-making skills.

Fresno County surface and ground water continue to supply more than 80 percent of total crop needs in the county. With its ground water supply in overdraft and surface water deliveries from federal and state sources down, agricultural water conservation programming is greatly needed, particularly on the county's west side. The primary water quality issues within the county include the continued salinization of the unconfined surface aquifer on the county's west side and chemical contamination from fertilizers and pesticides on the east side.

**Research**

Potassium Fertility Project

Current potassium nutrition guidelines for cotton were developed more than 20 years ago. Since that time, lint yields have increased an average of 14 lbs/acre per year. Because newer varieties are much higher yielding, it was determined that soil nutritional guidelines be updated. Two to three field sites were established in the county each year between 1993 and 1995 to study cotton's response to soil potassium applications.

As a result of these trials, new potassium nutrition guidelines were finalized as the third year of data became available. Soil potassium nutrition guidelines are being increased from levels used in previous years. Last year record levels of potassium fertilizer were used in the region which can, in part, be linked to this project. This research has been published and reported heavily to the industry and a greater awareness of the problem is being recognized.

Late Season Irrigation Management For Cotton

Reduction in irrigation water supplies are impacting planted acreage of field and row crops in western Fresno County. Because of water's high price and scarcity, improved methods of irrigation scheduling are needed by the grower. Field tests were established to evaluate the influence of soil texture, plant maturity stage, and cotton variety on ideal irrigation termination date. Irrigation management trials on growers fields having contrasting soil types and identifying final ideal irrigation timing were conducted to evaluate three maturity stages of cotton and plant maturity status as variables that influence termination date.

A report of the results of this study was presented to industry personnel, and local radio and television stations documented the study and presented it as a news feature.

Subsurface Drip Irrigation for Field and Row Crops

The use of subsurface drip irrigation in field and row crops is on the rise in Fresno County. Over 4,000 acres are currently in production with acreage expected to steadily increase over time. Subsurface drip irrigation, when properly designed, installed and maintained, can increase the distribution and efficiency of field applied water resulting in high farm productivity and reductions in applied water. This study was conducted on a model drip irrigation system located at the West Side Research and Extension Center to document challenges with three common west side crop rotations involving melons, tomatoes, and cotton.

A relationship was found between emitter spacing and cotton yield that has not been documented in past studies. These results have been presented to commodity groups, at the Salinity Drainage Annual Conference, and at a poster session at Agronomy Society of America (ASA) Plant and Soil Conference. Two workshops on drip irrigation were held with this site being used to demonstrate equipment, design, and maintenance.

Conjunctive Water Use From a Shallow Saline Water Table

A shallow saline water table is found beneath the soil surface on more than 130 thousand acres of western Fresno County farmland. Past UC documentation has established the importance of these waters as a resource to supplement in-season irrigation waters. Further studies were needed to document shallow water contributions to field crops and identify changes in soil quality over time when crop irrigation water supplies are reduced. Studies were conducted to investigate the yield, soil quality impact, and water table contribution to the crop when deficit irrigation water supplies are imposed.

Information was presented to a symposium in a poster format at the University of California's Salinity Drainage Task Force meetings. Growers have adopted the management plan by reducing applied water to field by 20 percent.

**Meetings**

West Side Research and Extension Center Cotton Field Day

West Side Research and Extension Center Cotton Field Day was held in September to enable the University to display and inform the cotton industry of key cotton research projects ongoing in the San Joaquin Valley. Each speaker provides a discussion of his/her research activities. Each meeting brings together a unique group of University and USDA researchers involved in weed control, defoliation, insect management, irrigation, fertility, breeding, and other disciplines of cotton production.

Winter Cotton Production Meeting

Each winter, data from previous years' trials are analyzed and reports finalized. The winter production meeting aids in getting key data from researchers to county clientele. Working with farm advisors, specialists, and faculty, an annual winter cotton meeting is held to deliver needed information on new varieties, recent price trends, seedling disease treatments, new pest management materials and other timely information.

Monthly Cotton Meetings

Cotton producers, PCA's, and related industry individuals require updated information aimed at optimizing in-season crop management strategies. Three monthly in-season production meetings, held in May, June and July, provide a forum that allows UC facilitated

interaction with the cotton industry and provides the best available research information.

**Clientele Served**

This clientele group includes growers, PCA's, agronomists and related industry persons estimated at 750 individuals. I also work closely with water agencies, the agricultural community on concerns which include irrigation scheduling, water quality, drainage problems, soil fertility and plant nutrition. This clientele group is estimated at 650 individuals.

**Publications**

Newsletters

Newsletters have assisted clientele by providing pertinent and timely information related to cotton, soil and water management practices. These newsletters also serve to promote program visibility within the county. The Agricultural Resource Manager and California Cotton Review Newsletters are published and delivered to my Fresno County clientele.

Munk, D.S. 1995. Irrigation management for corn silage during a drought. Fresno County Dairy Newsletter.

Munk, D.S. Summer 1995. Modifying soil and water quality with the use of gypsum. Agricultural Resources Manager, Vol. 3.

Vargas, R., D. Munk, et. al. June 1995. The 1995 planting season - a repeat of 1994? California Cotton Review. Vol. 36.

Munk, D. and Steve Wright. June 1995. Irrigation management that minimizes crop losses. California Cotton Review. Vol. 36.

Munk, D. 1995. Unusual weather impacts soil quality as well as the 1995 crop production season. Agricultural Resources Manager, Spring, Vol. 2.

Vargas R., D. Munk, et. al. 1995. Sample costs to produce cotton. UC Cooperative Extension publication. #3.

Popular Press

Hanson, B., A. Fulton, D. Munk, et. al. 1995. Drip irrigation of row crops: an overview. Irrigation Journal. April. pp. 8, 11-13.

Munk, D. June 1995. On the plus side: Rains fill storage and leach salts. California-Arizona Farm Press.

Reports

Munk D., J. Wroble. 1995. Drip irrigation-crop rotation studies for the western San Joaquin Valley. California Energy Commission Final Report.

Other Publications

Munk, D.S., D.W. Grimes and T.A. Kerby. 1995. Plant responses to water deficits in cotton. 1st International Cotton Production Research Conference. Brisbane, Australia.

Weir, B.L., D.S. Munk, S.D. Wright and B. Roberts. 1995. Responses to PGR IV of upland and Pima cottons in the San Joaquin Valley of California. Beltwide Cotton Production Conference, pp. 577-579.

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*David Snell, MS*
4-H Youth Develoment Advisor

Years Serving Fresno County: 19

**Program**

The purpose of the 4-H Youth Development Program is to help youth develop into responsible, self-directed, productive citizens of the world, and to improve the well-being of youth and society through the use of research-based, learn-by-doing educational experiences.

**Situation Statement**

The potential clientele of the Fresno County 4-H Program is all youth in Fresno County in the first grade through age nineteen, which is 136,739 children. The ethnic percentages are: Hispanic, 41.7%; White, 39.9%; Asian, 11.4%; Black, 6.2%; and Native American, .8%. The living environments range from urban (Fresno/Clovis Metropolitan Area) to rural/small town (Selma, Coalinga, Sanger, Kerman) to very rural (Tranquillity, Huron, Dunlap, Auberry). We have children experiencing large city problems and also rural isolation problems.

The economic status ranges from very affluent to very poor with the majority of children in the lower income groups. The per capita income in Fresno County in the 1990 census was $17,215, only 78.6% of the average for the state. The percentage of children under 18 living below the federal poverty level was 32.4% in Fresno County compared to a state average of 18.2%. This ranked Fresno County 56 out of 58 counties in the state.

The median years of education in Fresno County is 12.7, the state average is 13.4. The dropout rate of 22.5% for our students translates into social costs of $85.3 million in welfare, $41.9 million in health costs, $41.7 million in crime, and $27.4 million in unemployment costs in 1990 for a total of $196.3 million in costs to the taxpayers of Fresno County.

The births to teens in Fresno County in 1990 was 102.9 per 1,000 females aged 15-19 years. Only four other counties in the state had a higher rate of births for teens. The state average was 69.1 per 1,000 females 15-19 years of age.

In 1991, Fresno County ranked 49 out of 58 counties in the state for the rate of violent crime with 995 violent crimes per 100,000 population. Almost 27 percent of the felony arrests in Fresno County in 1992 were juveniles. The rate for the state at the same time was 16.6%.

The above facts attest to a great need for services to help youth in Fresno County. Directing children into productive employment and responsible lives through education and helping families raise their children, not only saves millions of tax dollars, but the loss in human potential is tremendous if we do not.

The Fresno County 4-H Program reaches out to the children and families of Fresno County with a diverse set of programs to help educate and develop our children into productive, responsible citizens.

In 1995, over 8,000 youth were involved in the Fresno County 4-H Program. Almost 700 adult volunteers and professionals utilized the 4-H Program to teach and develop these youth.

**Educational Activities**

School Enrichment

The Fresno County 4-H School Enrichment Program reached 6,645 students in elementary schools throughout the county. Two hundred and fifty-six professional teachers used these programs to enhance their classroom curriculum. The objectives of this program are to improve agriculture literacy, provide hands-on experiences for students in their

classrooms, and improve the students lives through increasing the awareness of their food supply and occupations within agriculture. There are 3 curriculum offered to teachers through inservice education at their schools and materials provided to them.

Plant Science offers an assortment of hands-on activities to learn about plants, but emphasizes some key agricultural crops; sugar beets, rice, and wheat. The classes can literally take these basic crops from seed to cooked food in their classroom. Teachers are also given supplies of seeds to use in their classrooms besides the educational curriculum.

Nutrition heightens the awareness of students about the food they eat. It helps them to eat the right foods so they can be healthy. The "Eating Right Is Basic" curriculum provides lessons for the teacher to use in the classroom to emphasize the importance of good nutrition towards having a enjoyable, productive life for the students.

Avian Embryology is by far the most popular 4-H School Enrichment program. Teachers are inserviced and given the materials to hatch chicks in the classroom. The curriculum provides the basic science of the development of the chicken embryo, but also emphasizes the human life experiences that can be related to what happens to the eggs and chicks in the classroom such as handicapped, parenting, and death. The students see eggs turn into chicks and learn that this is part of the natural system called agriculture that provides them with food. They are taught that these are the same animals that provide the chicken meat for their meals. This program has been offered to schools all over the county from Coalinga to Kingsburg to Clovis, but primarily to Fresno City schools where students do not usually have the chance to experience and learn about their food supply. Almost 6,000 students in Fresno County had the experience of having chicks hatch in their classroom in 1995.

Community 4-H Club Program

The most well known 4-H program is our Community Club Program. We have community clubs all over the county from Coalinga to Auberry to Kingsburg to Firebaugh. In 1995 we served almost 1,400 youth in this community based informal education program. Children participated in project areas from animal science to consumer science to rocketry to nutrition. Supporting and teaching these children were over 400 adult volunteers.

This family-based education system supports parents in their rearing of their children to be responsible, productive citizens. Children learn to work with others by learning to function at business meetings, serve as club officers, and work on committees. They learn communication skills through giving presentations and reports before their club. They learn decision making skills through judging contests.

The Fresno County 4-H Program has a full calendar of activities to support the education of the 4-H member. Below are some highlights of 1995.
January- Teen Leader Conferences to teach and develop leadership skills.
February- County Presentation Day provides opportunities for youth to improve their communication skills.
March- County Judging Day teaches decision making skills and explores the many projects available to members.
April- Fashion Revue allows members to model providing them an excellent activity to build poise and self esteem.
May- Fresno County 4-H Fair gives members the opportunity to exhibit their projects and learn from the evaluations provided by the judges.
June- Fresno County 4-H Camp provides a place for children to be on their own away from their parents, maybe for the first time, and also gives teen members a chance to develop their leadership skills.
July- Fresno County 4-H Marine Science Camp allows members and adult volunteers the opportunity to learn about ocean environment through marine animals, geology, and history at various sites along the California coast.
August- State 4-H Leadership Conference provides a learning experience for our teens to enhance their life skills.

September- Super Saturday gives 4-H families a chance to learn more about diversity and communications skills.
October- 4-H participation at the Big Fresno Fair allows members to exhibit and sell the products of their 4-H projects such as livestock and poultry.
November- Holiday Food Faire gives members the chance to exhibit their holiday recipes and decorations and enhance their food preparation and presentation skills.
December- This month is reserved for families and clubs to celebrate the holiday season and also start preparing for the following year's activities.

These are a few of the many activities. Others include project field days, volunteer leader trainings and conferences, and other educational meetings.

**Research Activities**

Youth, Gang Violence, and Clothing Styles

In cooperation with the University of California, Davis, Department of Environmental Design, a research project studying the correlation between the styles of clothing worn by youth and their involvement in violent and criminal gangs was initiated in 1995.

As youth violence increases, the visual perceptions between clothing and violence become more apparent. Can school and law enforcement officials use clothing as a definite indicator of gang involvement? Are there more important indicators of gang affiliation?

Five groups of teenagers from high risk high schools and youth programs were given still cameras and video cameras to record the styles of clothing that teenagers are wearing. The slides produced were used in focus interviews with teens to identify the styles and their implications to gang affiliation. The video tape will be edited with the 2 other counties in the state doing the research project, San Diego and Contra Costa. The final video production will give the message about youth styles to youth professionals as well as school and law enforcement officials.

Preliminary findings show that law enforcement and school officials cannot use clothing styles as an important indicator of gang affiliation. Tattoos and behavior are a more accurate indicator of gang participation. Arrests and school dress codes should not be tied to a clothing style. Youth clothing styles can change very quickly to respond to these policies for them to be viable. Some gang clothing styles are adopted by non-gang youth and could affect their relationships with schools and law enforcement officials. The wearing of gang styles can be a dangerous situation for youth unaware of them or imitating gang members. They must be warned of these dangers.

A data base, QBIC (Query By Image Content), will be developed from the slides taken by the youth to enable people to identify certain aspects of clothing styles relating to gang participation. QBIC will allow for the search and categorization of images based on image content by color, shape, texture, and composition without relying on text.

**Program Impacts**

The Fresno County 4-H Program is committed to help our youth become the citizens who will lead this county in the future. 4-H has a rich history of affecting people's lives as attested by the many community leaders we have today that were involved in 4-H. Those same leaders have given testimonials that 4-H was an important motivator in their lives to become successful.

Looking from a strictly economic standpoint, it would not take many diversions from a criminal to a productive lifetime to fund the 4-H program considering the high cost of the justice and prison systems. 4-H is there to help parents raise their children to be responsible, productive adults.

**Publications**

Newsletters

Snell, Dave and Wortham, Barbara: Monthly 1995, Guidelines Newsletter.

*Jeanette M. Sutherlin, MS, CFCS*
Nutrition, Family, and Consumer Sciences Advisor

Years Serving Fresno County: 20

## Program

The Nutrition, Family, and Consumer Sciences (NFCS) program serves the people of Fresno County in four major subject matter areas. These include nutrition, diet, and health; family development; food safety; and consumer economics. The Expanded Food and Nutrition Education Program (EFNEP), an extensive educational program, is offered to low income families and a new program, the Food Stamp Nutrition Education Program (FSNEP) has been initiated to serve food stamp families. Master Food Preservers (MFPs) are volunteers trained by the University of California to provide food safety and food preservation education and information and work as extenders teaching workshops, answering phone requests and sharing at fairs and community festivals. Research and education efforts focus on nutrition and health related issues that are relevant to Fresno County.

## Situation Statement

Fresno County has a very diverse population in terms of ethnicity and financial stability. The needs of individuals and families that can be addressed by the University of California Cooperative Extension (UCCE) NFCS program include nutrition education, meal planning, food buying, food safety, finance management and parenting education. Low income families are able to strengthen their economic base utilizing the educational opportunities offered by UCCE. These opportunities are important to all families in Fresno County as we struggle with the daily demands to provide food, clothing, and shelter.

## Research

### Dietary Intake and Lead Levels of Children at Possible High Risk for Lead Poisoning

Fresno County is considered a high risk county in California in terms of lead poisoning in young children. This study examined a possible link between dietary intake and lead levels in children between 1-5 years. Other California counties included in the study were San Bernardino, Tulare, and Sonoma (as a control). Of the 50 Fresno County participants in this study, no child had a blood lead level over 10 ug/dl. We worked with the Department of Health Services laboratory and the Pediatric Clinic at VMC. Children were examined and blood tests were taken to be analyzed for blood lead levels and trace elements. Two visits were made to each family which included extensive 24 hour diet recalls and family health histories.

The results of this study did not indicate any high blood lead levels in children. However, dietary intake indicated that, contrary of current Dietary Guidelines recommendations, 68% of one year olds consumed less than 30% of calories as fat; and these children may be at risk for iron and zinc deficiencies.

## Education Activities

### Expanded Food and Nutrition Education Program (EFNEP)

Over 22% of the population in Fresno County live at or below poverty level. In addition, 30% of children 0-17 live at or below poverty. Nutrition Education for low income families is a high priority in Fresno County. Once basic survival needs are met,

nutrition education plays an important role in increasing health and wellness opportunities for families.

There is a targeted effort to reach elementary schools, rehabilitative programs, and high school parent education. Elementary schools are offered the adult and youth component of EFNEP. In this manner, parents learn the same basic concepts that children learn in the classroom.

In the past year, 913 Fresno County families were enrolled in adult EFNEP classes and 4128 Fresno area children completed the youth EFNEP component.

The federal budget allotted to Fresno County for EFNEP (adult and youth) is $200,000. This funding provides for five (.5 FTE) nutrition education assistants, a full time nutrition program manager and full time youth coordinator.

Food Stamp Nutrition Education Program (FSNEP)

UCCE has recently begun a nutrition education program for food stamp recipients. Initially, classes were offered in Huron and Coalinga. These areas are difficult to access in the limited time available for this program, and will be served in 1997 by a staff member who will be local to the outlying west side communities. FSNEP is now offered to food stamp recipients who do not qualify to EFNEP (They do not have young children in the home). Participants attend 4-6 hours of instruction which focuses on nutritious food buying.

Master Food Preservers (MFPs)

Fresno County is home to abundant harvests each summer of produce which families enjoy preserving. Volunteers are trained by UCCE to share information and educate consumers to preserve in a safe manner. Twenty-five MFPs have actively taught classes, answered phones and presented displays and workshops in the Fresno community. In 1995, MFPs responded to over 300 phone requests and had 500+ consumers attend workshops in the community. A primary focus is food safety/safe food handling. Referrals to the UCCE Nutrition, Family, and Consumer Sciences advisor are often handled by Master Food Preservers. These referrals come from CSUF, Fresno County Health Services, Poison Control, and the Fresno Bee. MFPs are excellent extenders of information. They are knowledgeable and receive continuous training to maintain skills in food preservation and food safety.

Lead Education Workshops

Fresno County is considered at high risk for lead poisoning in young children. An educational display, video, and teaching materials have been developed to educate consumer audiences regarding the danger in lead exposure. 400 individuals have participated in lead education workshops in the last year and 42 extenders have been trained to conduct workshops.

Lead poisoning remains a national concern as a health hazard affecting children under six years. Through education, families become aware of the dangers and the actions which can protect children from lead contamination.

**Clientele Served**

I feel a deep commitment to serving families through out Fresno County. Often, this means using media and mass communication to deliver services. It also includes personal communication responding to concerns and requests via telephone. The largest clientele group served are low income families through EFNEP. The majority of these families live in the metropolitan Fresno area. Many also reside on the east and west side of the valley. The primary participant in EFNEP is the food purchaser and food preparer in the family. This includes men and women and extended family members.

Master Food Preservers serve a clientele who have an interest in food preservation

and/or food safety. This clientele group includes individuals through out Fresno County who have access to the abundant produce available here particularly in the summer months.

The EFNEP program is designated for a low income audience and in Fresno County this is predominantly a minority audience as well. The staff is composed primarily of minorities; four of whom are bilingual in Spanish, Hmong, or Laotian. I depend on the EFNEP staff for community minority contacts. The staff and I make the agency/organization contacts that initiate EFNEP involvement. 87% of all EFNEP contacts are minorities. It is through our collective efforts at marketing EFNEP, especially in metropolitan Fresno, that the EFNEP enrollment process comes about.

**Publications**

Scientific Peer-Reviewed

Dietary Intake in Children at Low & High Risk for Lead Poisoning. K. Fechner, C. Finnegan, C. Garrett, C. Lamp, J. Sutherlin, T. Zembal, S. Murphy, and S. Zidenberg-Cherr. Department of Nutrition, U. C. Davis, Davis, CA 95616; U. C. Cooperative Extension.

Trace Element Status in Children at Low & High Risk for Lead Poisoning. S. Zidenberg-Cherr, K. Fechner, C. Garrett, C. Lamp, J. Sutherlin, T. Zembal, S. Murphy, and S. Zidenberg-Cherr. Department of Nutrition, U. C. Davis, Davis, CA 95616; U. C. Cooperative Extension.

Newsletters

Sutherlin, J. M. 1995 - four quarterly published newsletters. FACTS for Fresno County Consumers focuses on research-based information in Nutrition, Family Living, and Consumer Education. Distributed to 1618 Fresno County households.

Popular

Sutherlin, J. M. Gifts from the Kitchen. A collection of ideas and recipes shared by Master Food Preservers and developed for food preservation workshops.

*Steve Sutter, MS*
Farm Advisor - Area Personnel Management
Fresno, Kings, Madera, and Tulare Counties

Years Serving Fresno County: 6

**Program**

The Agricultural Personnel Management Program (APMP) supports the use in agriculture of personnel management practices that improve operational results while meeting standards of labor law. I provide farm operators and other agricultural labor managers with practical research-based education in personnel management, advancing the application of it, and inform clientele about relevant labor laws and regulations, including those concerning worker safety. Although working primarily in assigned counties, I contribute my efforts beyond them as part of the statewide APMP.

**Situation Statement**

In Fresno, Kings, Madera, and Tulare Counties, 9,119 operators of farms hire employees. Over 300 farm labor contractors (FLCs) pay about 35 percent of wages to area farmworkers. Profits can evaporate if personnel management decision makers lack knowledge of employment-protective laws and effective human resource management.

**Educational Activities**

In 1995, I wrote 8 "Agricultural Personnel Management Program Newsletters" for 3,650 readers. These 4-page newsletters reached 959 Fresno County subscribers.

I summarized crop insurance changes in a newsletter, radio tapes, articles and a seminar, assisting outreach efforts by Farm Bureaus and USDA.

In 1995, I produced 81 articles in the popular press, including the Fresno Bee, and was cited in the farm print media on 26 other occasions.

I also aired 24 minute-long radio cuts for 8 California stations, spoke 3 times on television, and contributed to UC's English/ Spanish Broadcast Services. In 1995 I formed a "Farm Labor Contractor Advisory Group," held 3 meetings, produced 2 FLC newsletters, and summarized financial records of 6 FLCs, reporting results in the farm media.

I had the opportunity to speak at meetings across California 83 times in 1995. The number of talks in Fresno County led all other counties. Audiences averaged 64 persons. Most speaking commitments were responses to various organizations that paid my travel and lodging. I also responded to nearly 3,000 constituents by phone, fax, and mail.

I have completed an EPA "Fieldworker Train-the-Trainer Instructor's Guide," a 37-page project funded by the Pesticide Applicators Professional Association. Distribution to date is 400 copies.

I've assembled compliance materials related to the recent Department of Transportation regulations surrounding drug and alcohol testing of certain drivers with commercial licenses.

A project in progress entitled "Assistance for Agricultural Employers in Developing

Job Descriptions," will provide a booklet containing model agricultural job descriptions, helping employers meet requirements of the Americans With Disabilities Act, and other rules related to equal employment opportunity.

**Clientele Served**

In addition to work with employers, I provide information to supervisors, safety coordinators, workers compensation loss control representatives, and those employed by farm organizations, government agencies, migrant health clinics, media, various agency coalitions, nonprofit community-based organizations, and the general public.

**Publications**

Popular Press

Sutter, 1995, 81 articles in popular press
Sutter, 1995 cited in 26 popular press farm printed media.

Newsletters

Sutter, 1995, 8 "Agricultural Personnel Management Program Newsletter."