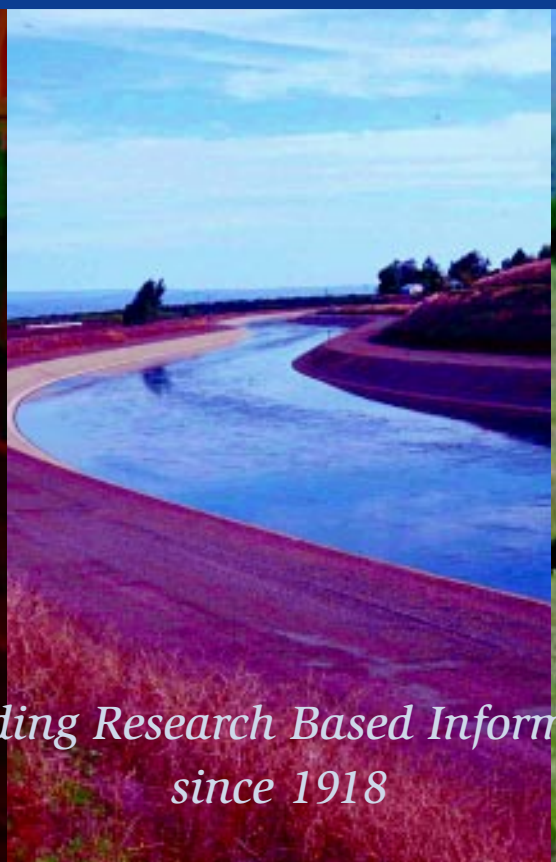
University of California Cooperative Extension Tehama County

Annual Report

Cooperative Extension Research & Educational Activity in Tehama County

2005-2006



Providing Research Based Information since 1918

Cooperative Extension

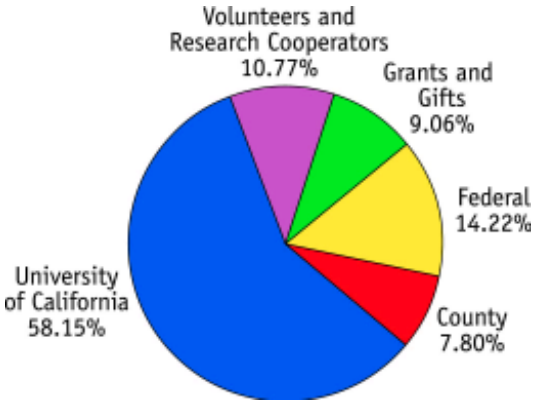
A nationwide system for non-formal education was established by Congress in 1914 to improve America's agriculture and to strengthen the nation's families and communities. A partnership was forged between the United States Department of Agriculture (USDA), the State land grant colleges and universities and county governments. Funding for its research and educational programs primarily comes from County, State and Federal governments.

Cooperative Extension was established in Tehama County in 1918. In the agreement, the County provides support staff and services in exchange for the University-paid programs and professionals.

Cooperative Extension's mission is to help all segments of the community benefit from the scientific advances in our nation's land grant universities, particularly in the areas of agriculture, natural resources, family/consumer sciences and youth development. This mission is carried out by university professionals and highly trained and dedicated community volunteers.

Major Funding Sources for Tehama County Cooperative Extension
2005-2006 Fiscal Year

University of California Support (Direct & Indirect)	$ 706,373
Federal Support (Direct & Indirect)	172,783
County Support (Direct & Indirect)	94,735
Grants and Gifts	110,053
Volunteers and Research Cooperators	130,880
	$1,214,824



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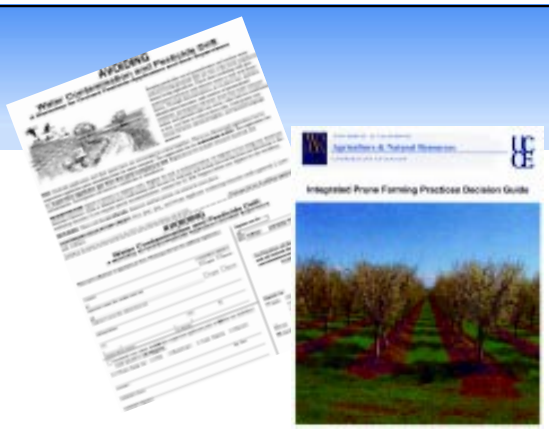
4-H clubs provide many hours of community service making a difference in their communities.



Educational workshops are held and various publications are available to "help people to help themselves."

Field assistants Kari Resch (l) and Cyndi Gilles (below) collect data.

Helping People to Help Themselves

Tehama County Cooperative Extension display at the Tehama County 150th Anniversary celebration held April 8, 2006. (l to r) Josh Davy, Richard Buchner and Cindy McClain.

Samples of almonds, dried plums and walnuts were available for tasting at the UC Cooperative Extension 150th display.

Our office staff: back row l to r: Jeanne George, Josh Davy, Rick Buchner and Allan Fulton. front, l to r: Cindy McClain, Deanna Rogers and Lisa Humphreys.

Orchard Crop Production

RICHARD BUCHNER AND CYNDI GILLES

Primary Tehama County horticultural crops include walnut, prune, almond, olive and strawberry nursery plant propagation. Walnut, prune, almond and "other orchard crops" had a 2005 value of $106,746,800. The 2005 value of nursery products including strawberry plant production was $1,787,000.

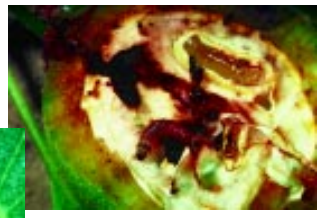
Economical and environmental issues will continue to present challenges for viable orchard production not only in Tehama County but throughout California. Issues such as agricultural discharge have become a much greater issue compared to years past. Both campus based and field based scientists are working with local agencies and farm cooperators to develop insect and disease management with techniques that reduce environmental risk. In some production systems application timing can be adjusted to decrease environmental risk.

Program Highlights

- **Plant based measurements for accurate water management decisions**. Tehama County Farm Advisors Richard Buchner and Allan Fulton plus County Research Associate Cyndi Gilles are using plant based techniques to manipulate tree water stress and measure effects. In simple terms we can measure the "blood pressure" of individual trees.

Cyndi Gilles measures tree "blood pressure".

- **Biological control of codling moth**. Codling moth represent a major pest for walnut production. Not only are moths challenging to control but sprays for codling moth often disrupt natural beneficial insects. Codling moth utilize an attractant or pheromone to locate each other for mating. Mating disruption saturates the air with pheromone which disrupts mating and subsequent egg laying.



Codling moth adult (l) and larvae (r).

- **Walnut rootstock evaluation**. Walnut production in Tehama relies on two rootstocks. The black rough looking rootstock is Northern California Black and the grey smooth rootstock is Paradox hybrid. Paradox is the rootstock of choice for most Tehama planting sites. Experiments are underway to identify superior Paradox rootstocks for walnut production.
- **Grafting date versus yield performance in Walnut**. Virtually all commercial walnuts are grafted and most orchards are planted with nursery grafted bare root trees. Some orchards are field grafted and occasionally trees are planted from seed. This experiment compares the economics of those three orchard development techniques.
- **Walnut blight control and management in Walnut**. Walnut blight caused by the bacteria *Xanthomonas capestris pv juglandis* is the most destructive above ground disease of walnuts. Tehama walnuts are at risk because they bloom in March and April when rainfall probability is high. Research in Tehama County has identified the most effective spray medicines and application timing.

Farm Advisor Rick Buchner evaluates Walnut blight.

- **Predormant sprays for prune aphid control**. Aphids are typically controlled using a pesticide plus oil applied when trees are dormant (often February or early March). This project is studying sprays applied in early November when runoff opportunity is less due to rainfall.

Leaf curl plum aphids

- **Use of ReTain® for improved walnut set**. Recent University of California field studies with the new Valent BioSciences plant growth regulator ReTain® suggest that it can improve set and increase yield. Research is underway to evaluate this new technology under Tehama conditions using local varieties.
- **Integrated Pest Management updates**. University of California research has developed heat accumulation models to predict insect activity. Using daily temperatures, expressed as Degree Days, insect growth and development can be predicted. Weekly pest update via email communicates this information to county orchard farmers and pest control advisors.

Weekly pest update

Grower meeting for extending productive information.

- **Walnut, Prune (dried plum) and Strawberry Production meetings**. These are classes held each year to extend new production information for grower use. 212 people attended three 2006 classes.
- **New Sacramento Valley Prune (dried plum) newsletter**. This is a new effort to combine expertise from Prune Farm Advisors in surrounding counties to produce a Sacramento Valley newsletter. Approaching the newsletter as a team of Farm Advisors has greatly improved information delivery to local farmers and improved advisor time efficiency. Four issues have been published reaching approximately 1,000 clientele in the Tehama County area alone.
- **Tehama County website**. Check out **cetehama.ucdavis.edu** for Tehama County Cooperative Extension programs and activities.

Integrated pest management weather station.

2005 Fruit & Nut Crops[1]

	Bearing Acreage	Production Per Acre (tons)	Total Tons	Per Ton ($)	Total Value ($)
Walnut	15,587	1.75	27,277	1,411	38,487,800
Almond	7,726	.80	5,940	5,650	33,561,000
Prune	8,327	1.5	12,490	1,350	16,861,500
Olive	5,616	4.0	22,464	570	12,840,500
Grapes	203	7.7	1,563	952	1,488,000
Pistachio	196	.49	96	3,293	316,100
Nursery (includes: Orchard Trees, Christmas Trees, Strawberry and Bedding Plants)					1,787,000
Other orchard crops (includes apples, apricots, peaches, etc.)					3,227,900
					108,533,800

[1]Tehama County Department of Agriculture 2005 Annual Crop Report

4-H Youth Development Program

Jeanne George,
Lisa Humphreys and Deanna Rogers

The 4-H Youth Development Program (4-H YDP) provides a wide variety of enrichment activities with the ultimate goal of engaging youth in reaching their fullest potential while advancing the field of youth development. The focus of all programs is the development of citizenship, leadership and life skills through a variety of projects and activities.

4-H in Tehama County is available through several delivery methods including community clubs, overnight camping, school enrichment and after school programs. The overall purpose of the 4-H YDP is to help young people discover and develop their potential in a partnership with a caring adult.

Community 4-H Clubs

In Tehama County, there are 12 community clubs with membership of over 450 youth and 154 adult volunteer leaders. 4-H clubs' encourage young people to set their own goals and make their own plans and decisions, helping boys and girls to mature and build self-confidence. By being part of a group, 4-H club members learn to understand and cooperate with others. The 4-H members in clubs operate under an established constitution and by-laws and elect officers. They plan, implement, and evaluate an annual Plan of Work. Adult volunteer leaders serve as coaches to the officers and members in these activities and guide them as they acquire leadership and citizenship skills. Clubs also offer project work for members to develop responsibility, knowledge and skills, and explore career choices. Sixty-one different projects were offered in 2005-06 with over 1,544 individual projects. The ten most popular projects were sheep, creative arts & crafts, swine, foods & nutrition, horses & ponies, community pride, shooting sports, photography, leadership development and rabbits.

Corning 4-H Club officers.

All clubs participate in community service making a difference in their communities. Some examples include Red Bluff Veterans' Hall monthly clean up, making quilts & sleeping bags for the homeless vets, clean up & flower planting days with Corning Hometown Revitalization, Collection of Pop Tops for Kidney Dialysis, adopt-a-grandparent, and assisting at elder care homes.

Pop Top collection

Visiting with the elderly at local care homes.

4-H club members also participate in countywide events and activities exhibiting and/or enhancing their knowledge and skills. These events include Favorite Foods Day; Home Economics Judging Skills Day; Presentation Day, Livestock Judging Skills Day; Fur, Feathers and Udders Fair; 4-H Fair and Fashion Revue. And then many participate in the annual Tehama District Fair with livestock and still exhibits.

Afterschool Programs, School Enrichment & FSNEP

4-H has continued the positive collaboration with the Tehama County Department of Education Safe Education and Recreation for Rural Families (SERRF). In 2004-2006, 4-H staff provided lessons and resources to implement science activities at six sites for over 600 youth. Through a grant from Environmental Systems Research Institute (ESRI) software, 4-H sponsored several learning opportunities for youth using GPS and GIS technology. Check out the Tehama County maps developed by 4-H members and school enrichment projects at http://www.esri.com/industries/k-12/atlas/.

The curriculums, "It Came From Planted Earth" and "Pond Mapping", are being submitted for ANR publication and nationwide distribution. Both were extensively pilot-tested in Tehama County enhancing the science processing skills and knowledge of youth, grades 4-6.

The Food Stamp Nutrition Education Program for Youth (FSNEP-Youth) provides hands on activities for children, grades Pre K-6th, to apply knowledge to improve their health and physical fitness. 4-H staff train teachers and give them the lessons and materials to implement the program in their classrooms. In the 2005 and 2006, 118 teachers from school, after school and preschool settings participated serving over 2,900 students.

FSNEP is hands on activity for children at local schools.

Camp

The annual Tehama County 4-H Camp continues to be a favorite among youth and teens. The overnight camp is successful because of the adult volunteer support and responsible teens accepting leadership roles. Each year over 100 youth, grades 4-8, attend to explore the outdoors and leisure activities, participate in team cooperative activities, and build lasting friendships.

At the 2006 camp, over thirty-five teens will provide leadership and enhance their life skills as teen staff. In addition, Tehama County is involved in a two-year statewide 4-H camp evaluation to document the impact of the camping experience on youth development, learn about areas to improve and share our experiences statewide. The evaluation is measuring the impact the camp program has in building supportive relationships, creating a safe place, providing youth involvement, and enhancing life skills and knowledge.

Camp is well attended (above) Volunteers and teen staff assist at camp from making bird feeders (r) to assisting with archery lessons (top).

Total 4-H Participation in 2005-06

- 2,148 youth
- 154 adult volunteer leaders

Irrigation & Water Resource Program

ALLAN FULTON

Tehama, Glenn, Colusa, and Shasta Counties

All aspects of the California economy and life style are dependent on water. This holds true for Tehama County and its neighboring counties in the Sacramento Valley.

In 2005, over 80,000 acres of irrigated orchards, row crops, and pastures in Tehama County infused over 125 million dollars of gross revenue into the local economy. Irrigation is a farming practice essential to a thriving agricultural industry. On average, 308,000 acre-feet of water is needed annually to support the local agricultural industry and rural life style.

In the 1970's in Tehama County, surface water supplies from the Sacramento River system and its tributaries provided two-thirds of the county's water supply and the remaining one-third was extracted from groundwater aquifers. By the 1990's, two-thirds of the water supply in Tehama County was extracted from groundwater and only one-third was from surface water supplies. This trend towards increasing reliance on groundwater continues today in Tehama County and in our neighboring counties. Greater reliance on groundwater is the result of more costly and less reliable availability of surface water supplies coupled with more overall demand for water for urban, industry, agricultural, and environmental uses.

The Sacramento River and its numerous tributaries provide vital waterways for Chinook salmon and wetland habitat as part of the Pacific Fly Way for migratory waterfowl. Protection and enhancement of water quantity and quality in the Sacramento River watershed are sought to preserve these natural resources into the future, and to support fisheries and recreational sporting industries.

From a broader perspective, Tehama County is part of the Sacramento River watershed, representing the state's largest river and tributary system. The Sacramento Valley is also recognized as one of the foremost groundwater basins in the state. Major water supplies are provided for use in the Sacramento Valley and for export to other regions of the state.

Sprinkler irrigated walnut orchard.

CIMIS weather station.

The Challenge Ahead

Local agriculture, environmental, urban, and industrial interests all need reliable and sufficient supplies of water of suitable quality now and into the future. If current population growth trends continue regionally and statewide, water demand is projected to exceed the existing developed water supply by 2.5 million acre-feet by 2020. Sacramento Valley counties, such as Tehama, will be challenged to ensure their local, long term water needs are secure and to cope with exports of water to other regions of the state.

This irrigation and water resources extension program provides problem-solving research, educational activities, and public services in support of local management of the irrigation and water resources.

Program Highlights

1. **Advances with on-farm irrigation management**. Activities assist farmers and ranchers to optimize productivity and water use.
   - Demonstration of "state of the art" irrigation methods and irrigation management tools. For example, the development and adoption of a new irrigation management tool, "pressure chamber and stem water potential", for quantifying water stress in orchards and optimizing when and how much irrigation water to apply for better productivity
   - Support for the "Tehama County Mobile Irrigation Lab", a technical service to area growers that evaluates individual irrigation systems for distribution uniformity, system improvements, maintenance, and efficiency
   - Steps to reduce energy costs for pumping groundwater

Pumping plant for orchard irrigation.

2. **Groundwater issues.** Educational program providing information on water wells, pumping plants, and groundwater management from local and regional perspectives.
   - Understanding the groundwater aquifer systems in the northern Sacramento Valley
   - Approaches to groundwater management in rural northern California
   - Well drilling methods and considerations when selecting a pump
   - Conjunctive water management concepts
   - Groundwater quality and land subsidence

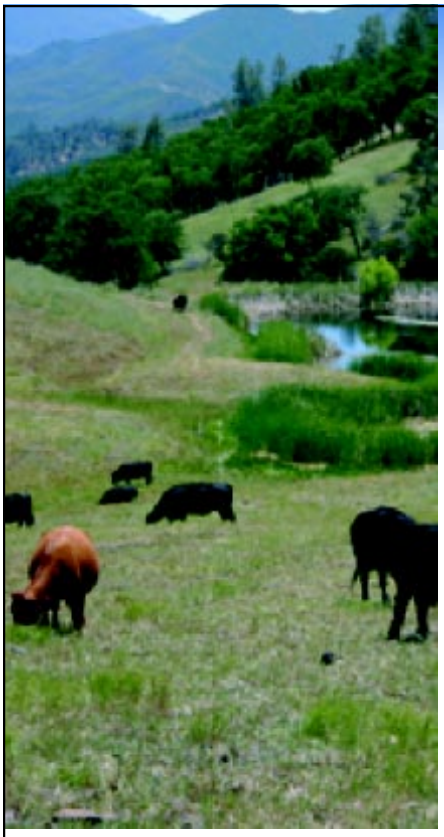
3. **Irrigated Agriculture and Surface Water Quality.** Local leadership and education on water quality issues.
   - Understanding new surface water quality regulations facing irrigated agriculture
   - Facilitating local surface water quality management efforts
   - Development and adoption of farm and ranch practices that are economically viable and continue to protect or enhance water quality

Farm Advisor Allan Fulton operates a neutron probe for a soil moisture measurement.

Flood irrigation using surface pipe for water delivery.

Sprinkler stream splinter installed to keep tree trunks dry.

Ground water is crucial for Tehama County.



Livestock & Natural Resources Program

Josh Davy

Tehama County hosts nearly a million acres of productive grazing rangelands (930,000 Acres). Foothill rangelands are the primary forage resource for grazing animals in California (wildlife and production livestock). The importance of these rangelands is due to the unique Mediterranean type climate of the Sacramento Valley. Mild winter weather provides a source of winter forage that is unavailable in most parts of the US. In addition, Tehama County's highly productive valley soils provide approximately 22,000 acres of irrigated pasture for summer grazing. The National Agriculture Statistics Service reports over 68,000 head of cattle and almost 14,000 sheep and goats inhabit the county.

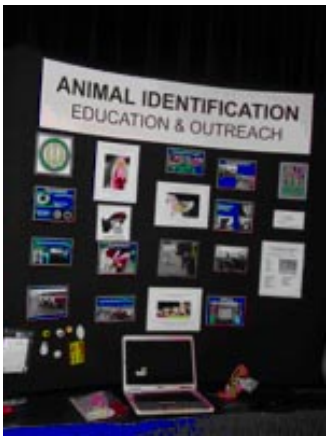
Societal concerns for the preservation of native vegetation, water quality, and grazing practices directly affect livestock production in Tehama County. This is augmented by the growth in population targeted for the county in the near future. Livestock production is already strained by large investments and marginal returns. Proactive research and educational materials in multiple subjects are necessary to keep Tehama County livestock producers economically and environmentally sustainable.

The livestock and natural resources program conducts research and educational support in the areas of marketing, ranch management, feeding and supplementation strategies, grazing and natural resource management. Current and future projects work to keep production agriculture and natural resources healthy and sustainable.

Josh Davy records species composition on annual rangeland.

Yearling cattle wait for their chance to help with ultrasound research

Program Highlights



Animal ID Demonstration booth.

- Animal Identification - Development of a series of facts that cover information from background material to implementing an animal identification system. Demonstration material was developed to familiarize producers with different animal identification technologies at field days and workshops. Up to date newsletter releases as well as a National survey on the current status of NAIS work to provide the most up to date information possible.

- Livestock Production - Using ultrasound and DNA testing technologies, current research is being conducted to determine whether ultrasonic measurement of heifers at replacement selection age can be correlated to carcass traits of half-sibling herdmates at harvest, which would provide a marketing edge for producers. Current research is also testing whether data collection of pre- and post- weaning variables can lead to the prediction of ending carcass traits (REA, marbling score, & back fat thickness)

- Rangeland Production - Research targets determining practical means of maximizing annual rangeland production through grazing management, fertilization, perennial and annual clover planting, and rangeland monitoring.

- Irrigated Pasture Production – Current projects look at maximizing production of irrigated pastures while minimizing costly inputs. Educational material has also been developed to manage and prevent invasive weeds in irrigated pastures.

- Water Quality – Water quality has evolved into an issue that is unavoidable for livestock producers. Ongoing research is being conducted to determine which irrigated pasture management practices can best work to comply with California water quality regulations.

Josh Davy (r) and Kari Resch (l) evaluate a transect while monitoring rangeland.

- Weed Control and Grazing - A three-year study on rangelands will determine proper protocols for the use of grazing to reduce medusahead (Taeniatherum caput-medusae) infestations. Other projects focus on grazing as a management tool for weed control, optimizing species diversity, and the encouragement of native perennials.

- Workshops and educational field days - Events cover multiple topics such as: animal behavior, irrigated pasture production, rangeland production, fertilization considerations, marketing and business management, water quality, weed management, issues dealing with animal identification, ruminant nutrition, and even horse nutrition.

May 8, 2006 animal behavior workshop featuring Temple Grandin (center) Larry Forero (left) Josh Davy (right). photo courtesy of Jean Barton.

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Cooperative Extension Work in Agriculture and Home Economics U.S. Department of Agriculture, University of California, and County of Tehama Cooperating.