



COOPERATIVE EXTENSION

Bringing the University to You

Applying Research to Community Education

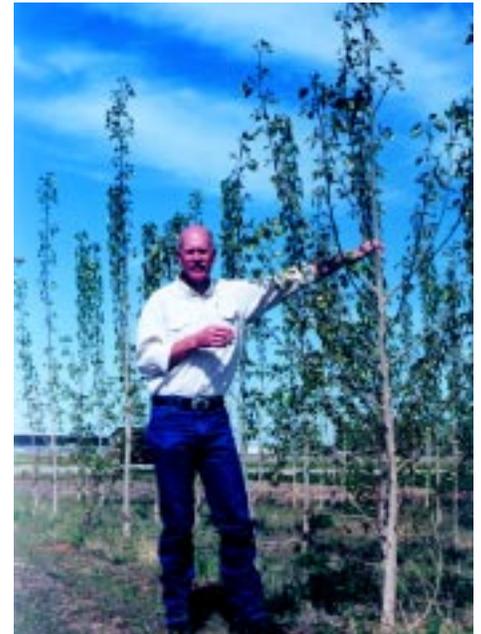
ALTERNATIVE CROP TRIALS

New crops have potential to sustain agriculture and conserve water

Experimenting with new crops is a costly and hazardous adventure for Nevada farmers, so University of Nevada Cooperative Extension (UNCE) faculty are testing alternative crops for survivability and water efficiency. Crops that may have a higher value or lower water requirement than traditional crops are studied in replicated trials at Newlands Agricultural Experiment Station in Fallon and on private farms. The successes and failures are shared with farmers statewide. Here are some examples:

■ **Hybrid poplar trees.** Research began in 1998 with the planting of 300 trees of three varieties at Newlands and in Eureka. The Eureka trees averaged 53 inches of growth the first year, but

perished in the winter. The Fallon trees flourished, reaching heights of more than 20 feet, while less than 5 percent died. The fast-growing trees have potential as windbreaks and a commodity for commercial firewood production and nursery stock. Research continues on the cost-benefits of the three varieties. Meanwhile, the poplars have become so popular that farmers will plant an estimated 5,000 trees in 2001 at other sites.



Cooperative Extension's Jay Davison examines poplar trees (after spring pruning), being tested as an alternative crop.

■ **Warm-season grasses.** Twelve species, seeded at Newlands in 1998, are set for production data collection in 2001. They show potential for high-quality grazing during mid- to late-summer.

■ **Switchgrass.** This Newlands crop has potential as a summer forage and an alternative energy source. After harvest in 2001, the grass will be evaluated as a potential pellet fuel.

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What is applied research?

Applied research is the application of scientifically controlled trials, treatments or experiments to solve practical problems and meet specific needs as well as gain new knowledge.

Through applied research, Cooperative Extension faculty work to improve quality of life by, for example, enhancing agricultural crop production, reducing contaminants in drinking water, conserving precious water resources and changing the behavior of troubled youth.

When UNCE conducts the research and education projects reported in this publication, it often cooperates and collaborates with many groups – the Nevada Agricultural Experiment Station, College of Human and Community Sciences, other colleges, agencies, organizations and volunteers.

Literacy program evaluations reveal parent-child reading sessions work

Research shows that when children are not read to before entering school, they are more apt to have difficulty learning to read and fall behind in other subjects as well. With a quarter of Nevada's population having inadequate literacy skills, Cooperative Extension teamed with other partners to address the issue at the best time – during the preschool years.

Family Storyteller includes six workshops where parents are guided through reading and other literacy activities with their children. Seven new research instruments were developed and tested to evaluate the success of the education. They revealed significant increases in the number of times participating parents and children read together; children asked to be read to; children looked at books or magazines alone; and the enjoyment parents receive reading with their children, and vice versa.

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The Family Storyteller program researches parent-child reading interactions to help improve literacy skills.

MAGIC program shows first-time juvenile offenders can change

Tragedies like Columbine High School have made us painfully aware of the need for collaborative preventive programming that changes youth behavior and builds skills through research and education.

Project MAGIC (Making a Group and Individual Commitment) educates youth referred by juvenile authorities in small-group settings, accomplishing measurable increases in life skills and, in nearly all cases, preventing further involvement in the juvenile justice system.

Research in Elko County and the Duck Valley Indian Reservation during 2000 indicates the participating youth achieved a 7 percent increase in their internal control, a 191 percent improvement in life-skills subjects and a 27 percent behavior improvement. Their parents, in corresponding classes, achieved a 32 percent increase in life-skills knowledge.

A study shows that teen graduates of the 10-week program in Elko, Humboldt and Lander Counties exhibit increases in decision making, conflict resolution, goal setting and communication skills.

The program has been adapted to Clark County, where 2,500 youth face incarceration and probation each month. Research techniques are being applied to compare the differences between MAGIC rural and urban program impact.

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WORKSITE WELLNESS PROGRAM

Helping employees understand their risk of heart disease

Health at Work is an example of applied research in the workplace. Cooperative Extension and other university specialists conducted assessments on nearly 200 workers at three Cashman Equipment plants. They gave classes on physical fitness, nutrition and stress management, and then repeated the assessments to measure program impact. The purpose of the research and education was to develop skills to reduce workers' risk for coronary heart disease (CHD) – Nevada's No. 1 killer.

The results?

Nearly 90 percent of participants better understand their CHD risk; more than 80 percent say the program improved their ability to maintain healthy lifestyle changes; while others reduced their dietary fat intake and are more physically active.

Researchers developed and distributed a curriculum to more than 80 nutrition educators statewide.

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ALFALFA HAY AND SEED

Projects help farmers use less water, fertilize efficiently and increase yields

Alfalfa hay and seed are important agricultural commodities in central Nevada's rural counties. In Pershing County alone, they contribute nearly \$15,000,000 to the annual economy. In a needs assessment, farmers identified alfalfa profitability and conservation of natural resources as their top priority. Here are some ways Cooperative Extension is responding:



Cooperative Extension's Don Breazeale studies the relationship between water, fertility and bee pollination to maximize alfalfa profits.

- **Irrigation, fertility and pollination management.** Begun at Newlands Agricultural Experiment Station in 1999, this three-year study focuses on water use, fertility management and pollination of alfalfa by bees to maximize yield and profits. The 2000 growing season resulted in no statistically significant differences in seed yield due to frequency and amount of water applied.



- **Subsurface drip irrigation (SDI).** This multi-year project tested a state-of-the-art, fully automated underground system on a Lovelock farm. The research demonstrated that SDI saves water and increases alfalfa production without negatively impacting the environment. However, given current prices of water and alfalfa, it's only marginally economically feasible. This technology is more appropriate for alfalfa seed, with more than 300 acres currently in production.

- **Precision irrigation.** This Lander County research project measures water use rates on alfalfa and adjusts applications to maintain optimum soil-moisture levels. Production data collection begins in 2001.

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Precision agriculture: applying technology to crop production

Lyon County is the nation's largest producer of sweet, white fresh-market onions, a ripe situation for a pilot project on a new site-specific way to apply fertilizer, crop-protection products and soil amendments. It's also hoped this precise method of application will reduce pollutants discharged through runoff into surface waters, and improve water quality in the Walker River Basin.

Using geopositioning systems and mapping software, research has begun on the country's largest soil-to-supermarket onion operation. Three fields have been mapped, soil samples collected and analyzed and the results overlaid on base maps. This will determine variable rate applications of pesticides and soil amendments. Yield data collected during fall 2001 harvest will be measured against the costs of field treatments to assess cost-benefits of this new technology.

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Cooperative Extension collaborates with Peri & Sons Farms Inc., in Mason Valley, to test precision agriculture techniques on onion fields.

Sheep help restore Nevada's fire-ravaged rangelands

After Cooperative Extension's "ewes" project was successful in reducing fuel loads on Carson City's fire-prone and populated C-Hill, researchers began to study how sheep could help restore rangelands after wildfires.

Initiated in 2000, a three-year controlled experiment near Battle Mountain evaluates the difference between mechanical weed control and seeding techniques and using sheep to accomplish the same treatments. With the help of agency and college partners, 48 acres of rangeland were treated. The sheep-grazed plots produced 45 percent less annual mustard than the untreated plots, and fire-prone cheatgrass was reduced by more than 66 percent.



Cooperative Extension tests the ability of sheep to control weeds and push native seeds into the soil on rangelands.

Studies continue to determine if sheep will keep competitive weeds down and improve the success of native and introduced seeding. Seeds that are "broadcast" have a more difficult time surviving, say experts; however, when sheep push them into the soil, the survival percentage should increase, along with beneficial nitrogen applications.

Another project compares the effectiveness of leafy spurge weed control by sheep grazing, herbicide application, and a combination of the two methods, on private property in Elko County.

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New tool may signal heifer pregnancy after artificial insemination

When ranchers can develop and retain heifers conceived by artificial insemination early on, they have some management and economic



Researchers study the use of kamar heat detection patches to determine post-AI conception.

advantages. As much as \$100 a head in sales can be added to a properly developed, uniform group of heifers guaranteed to calve on a certain date. Keeping only artificially inseminated (AI) heifers

Well water tests in Washoe Valley show nitrate levels threaten drinking water

As part of Cooperative Extension's Small Ranch Water Quality Program, 43 private wells were sampled in east Washoe Valley during 1999 and 2000. This research examines trends in concentrations of nitrates and fluoride to determine if changes occur that may impact human health.

Seventeen of the 43 wells exceed the drinking water standard for nitrates; an additional five exceed the drinking water standard for fluoride. The source of fluoride may be naturally occurring deposits in the ground that are not affected by urbanization. The average nitrate concentrations, however, increased in 19 wells, suggesting the rise may be due to contamination from animal wastes and/or septic systems.

After testing, homeowners receive assistance in remediating drinking water problems through site visits, workshops and an ongoing newsletter.

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Cooperative Extension examines well water in Washoe Valley that might contain contaminants affecting the drinking water.

improves genetics and consolidates calving.

Cooperative Extension is researching the use of kamar heat detection patches as a 30-day, post-AI conception determination tool. The patches cost \$1 per head, and the procedure involves some labor. It is being tested at the university's Gund Ranch and at a private ranch in Elko County.

The heat patch is also used in a corresponding study in the same locations that looks at improving second-conception rates in heifers. In a needs assessment, ranchers reported that lack of second conception is one of the biggest economic drains on livestock operations.

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TALL WHITETOP

What is its economic impact? What can we plant to replace it?

Cooperative Extension's Tall Whitetop Initiative, legislatively funded in 1999, resulted in numerous test plots; hundreds of acres mapped and then sprayed or pulled; educational workshops; and volunteer collaborations to continue vigilance against this tough weed. Here are some unique research projects that grew out of these efforts:

■ Economic costs of delaying weed control.

In Douglas County, economists found that delaying control of tall whitetop infestations by four years would more than double the year-1 costs of weed management. Failure to devote resources early requires appreciably more money in the future. And this doesn't take into account other economic losses, such as damages to grazing and recreational use of the land.

■ Economic impact of weeds along the Walker River.

Using the Walker's West Fork as a study area, economists are developing cost-benefit analyses over future time periods. They're looking at the economic losses of non-control compared to control costs to help land managers better understand the long-run payback of weed management.

■ Effectiveness of herbicide control and revegetation species.

In Washoe Valley's Scripps Wildlife Refuge, a 6-acre tall whitetop control and revegetation test plot was established in 2000. After



Tall whitetop in full bloom



Cooperative Extension investigates the economic losses of non-control compared to tall whitetop control along the Walker River.

herbicide control of tall whitetop infestations, changes in plant compositions will be calculated and mapped in 2001. This will provide data on the effectiveness of the herbicide and its impact on non-target vegetation. It will also give information to land managers on which plant species can successfully recolonize recovery areas after tall whitetop is removed.

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Biosolid recycling could help desert soils

Biosolids are the material waste that remains after sewage has been dewatered at sewage treatment plants. The current disposal method in Clark County is to take the waste to a landfill outside Las Vegas. However, other states have been recycling biosolids into usable products, such as a fertilizer/soil amendment which would add organic matter to desert soils.

Cooperative Extension developed and mailed a survey to 16,000 residents to determine the level of acceptance residents have toward the use of composted biosolids in various applications. Eighty-one percent of respondents felt recycling the waste is important. Three-quarters of respondents were not aware of the current sewage disposal system, and were in favor of finding uses for a recycled product.

Cooperative Extension is responding with a recycling research and educational program that will include a cost-benefit analysis.

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Using satellite technology to save water

With the help of western Nevada water agencies, Cooperative Extension is expanding its Washoe Evapotranspiration (ET) Project to a satellite project – only the third in the nation – that has saved up to 30 percent of water in California for residential and commercial users.

The research project compares four watering treatments: “intuitive” irrigation (whatever the resident thinks is right); manual ET-scheduled irrigation (watering by web-based local daily rates dictated by weather stations); manual ET-scheduled irrigation with management training; and ET satellite-controlled irrigation. The cost-benefits will be analyzed and compared for each treatment, using fixed water costs in the Truckee Meadows.



Cooperative Extension's Bill Carlos (left) leads a collaborative research project to conserve water in the Truckee Meadows.

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Center focuses on urban water conservation

Among the thousands of new residents moving into the Las Vegas Valley each month are people who are not familiar with the urban desert environment. To help conserve precious water and environmental resources, Cooperative Extension manages the Center for Urban Water Conservation, a 10-acre project in North Las Vegas, for research and education. Assisted by private and public agencies, researchers are studying:

- How much water turfgrass, trees and plants actually use in the desert, and the best methods of efficient irrigation.
- The best landscape plants to use when irrigating with recycled, saline water.
- The use of remote sensing to determine water and fertilizer status of turfgrass on golf courses and other large turf areas.
- The performance of various vegetable varieties in southern Nevada.

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Searching for alternative water sources in the Las Vegas Valley

The Las Vegas Valley is among the fastest growing communities in the nation, and yet the existing water allotment may be reached by the year 2010. Nearly a third of the valley's water is used by managers of large turf areas, such as golf courses, parks and schools. Cooperative Extension investigates alternative irrigation sources to free up “good quality” water for residential use:

Utilization of the shallow saline aquifer. Controlled and applied field studies demonstrate that this water can be used as a supplemental source on large turf areas during peak demand months. However, it has a salt load two to eight times higher than Colorado River water, and foliar damage can result from applying the water directly to canopies of woody ornamental plants.

Comparative study of golf courses irrigated with recycled water. This three-year study helps golf courses transition to using treated sewage effluent (reuse water). However, after researching the effects of the water on the canopies of 20 tree species, only six



Cooperative Extension researchers work with golf course managers to investigate the effects of recycled water on various landscape plants.

tolerated the applications. Good-quality water rinses were found to significantly minimize foliar damage to trees.

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