



# Western Region County Agent's Professional Improvement Conference



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October 24 & 25, 2007  
Holiday Inn Palo Verde  
Tucson, Arizona

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Hosted by the Arizona Agricultural Extension Association





Old Main, University of Arizona, 1891

### Special Thanks To the Planning Committee Members

**John Begeman, University of Arizona**  
**Rob Call, University of Arizona**  
**Mike Crimmins, University of Arizona**  
**Dean Fish, University of Arizona**  
**Rob Grumbles, University of Arizona**  
**Jack Kelly, University of Arizona**  
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**Chad Reid, Utah State University**  
**Jeff Schalau, University of Arizona**  
**George Zaines, University of Arizona**

**Cover Photo:** January 1940, photo caption “County Agent’s Annual Cattleman Tour, Stop #11 at Desert Tank revegetation area. At this stop, Dr. Hardies of the SCS explained artificial revegetation work being done.” Photo from archives of the Santa Rita Experimental Range.

# Western Region County Agents PROFESSIONAL IMPROVEMENT CONFERENCE

October 24-25, 2007  
Holiday Inn Palo Verde  
4550 South Palo Verde Boulevard, Tucson, AZ 85714

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***GENERAL AGENDA***

**WEDNESDAY, OCTOBER 24<sup>TH</sup>**

- 8:30-9:00 a.m.            ***Registration***
- 9:00-9:15 a.m.            ***Welcome***  
*Dr. Colin Kaltenbach, Dean, College of Agriculture and Life Sciences, University of Arizona*
- 9:15-10:00 a.m.         ***An Overview of Arizona Water Issues with a Focus on the Arizona Water Institute***  
*Dr. Kathy Jacobs, Director, Arizona Water Institute*
- 10:00-10:45 a.m.        ***Climate at 45 RPMs: "A Side" - What every extension agent should know about Western U.S. climate; "B Side" - Arizona Drought Plan Innovations***  
*Dr. Gregg Garfin, Program Manager, Climate Assessment of the Southwest*
- 10:45-11:00 a.m.        ***Break***
- 11:00-11:45 a.m.        ***Trends in Arizona Agriculture***  
*Dr. Jeff Silvertooth, Department Head; Soil, Water and Environmental Science, UA CALS*
- 11:45 a.m.-12:00 p.m.    ***Western Region Director's Report***  
*Michele Hebert, Western Region Director NACAA, Alaska Cooperative Extension*
- 12:00-1:30 p.m.         ***Lunch (provided on Terrace)***
- 1:30-3:05 p.m.           ***Presentation of Papers***  
(two concurrent sessions-see presentation schedule in this proceedings)
- 3:05-3:20 p.m.           **Break**
- 3:20-4:55 p.m.           ***Presentation of Papers***  
(two concurrent sessions-see presentation schedule in this proceedings)
- 4:55-5:30 p.m.           ***Discussion Groups/Future Planning***
- Evening                    ***Visit Tucson***

**THURSDAY, OCTOBER 25<sup>TH</sup>**

- 8:30                        ***Leave Holiday Inn***
- 9:15                        ***Arrive at FICO (Green Valley Pecan Co.) for Plant Tour***
- 10:30                       ***Arrive for orchard visit at FICO (Dr. Mike Kilby)***
- 11:15                       ***Depart for ZZ Cattle Company Ranching and Border Issues (Dan Bell)***
- 12:00                       ***Lunch at ZZ Cattle Co. Presentation on border ranching***
- 1:30                        ***Depart for packing house visit***
- 2:30                        ***Depart for Tubac shopping visit (Optional)***
- 3:00                        ***Depart for Tucson***
- 4:00                        ***Arrive Back at Holiday Inn***

# Western Region County Agents

## PROFESSIONAL IMPROVEMENT CONFERENCE

### PRESENTATION SCHEDULE

Granada Room

October 24, 2005

SESSION I		
HORTICULTURE	1:30-1:45 p.m.	<i>The Effects of Salinity on Cacti and Succulents</i> J.J. Kelly, University of Arizona
	1:50-2:05 p.m.	<i>"A Taste of Technology" – Advanced Master Gardener Training</i> R.E. Call, University of Arizona
	2:10-2:25 p.m.	<i>Efforts to Control Bermudagrass Diseases on a Golf Course Green</i> N.M. Nagata, University of Hawaii
	2:30-2:45 p.m.	<i>Shade Tolerant Plants, Low Water-Use Plants for the Arizona High Desert</i> C.K. Jones, University of Arizona
	2:50-3:05 p.m.	<i>Building the Capacity of the Yavapai County Master Gardener Program Through Volunteer Engagement</i> J.W. Schalau, University of Arizona
	3:05-3:20 p.m.	<b>BREAK</b>
NATURAL RESOURCES	3:20-3:35 p.m.	<i>Land Applications of Biosolids to Restore Disturbed Western Rangelands</i> L.K. Greenhalgh, Utah State University
	3:40-3:55 p.m.	<i>Extension's Role in Federal Land Use Planning in Utah</i> J.A. Gale, Utah State University
	4:00-4:15 p.m.	<i>The Riparian Extension Program in Arizona</i> G.N. Zaimes, University of Arizona
ENTO-MOLOGY	4:20-4:35 p.m.	<i>Biological Weed Control Efforts and Results</i> J.V. Barnhill, Utah State University
	4:40-4:55 p.m.	<i>Evaluation of Preventative Alfalfa Weevil Control</i> M. Nelson, Utah State University

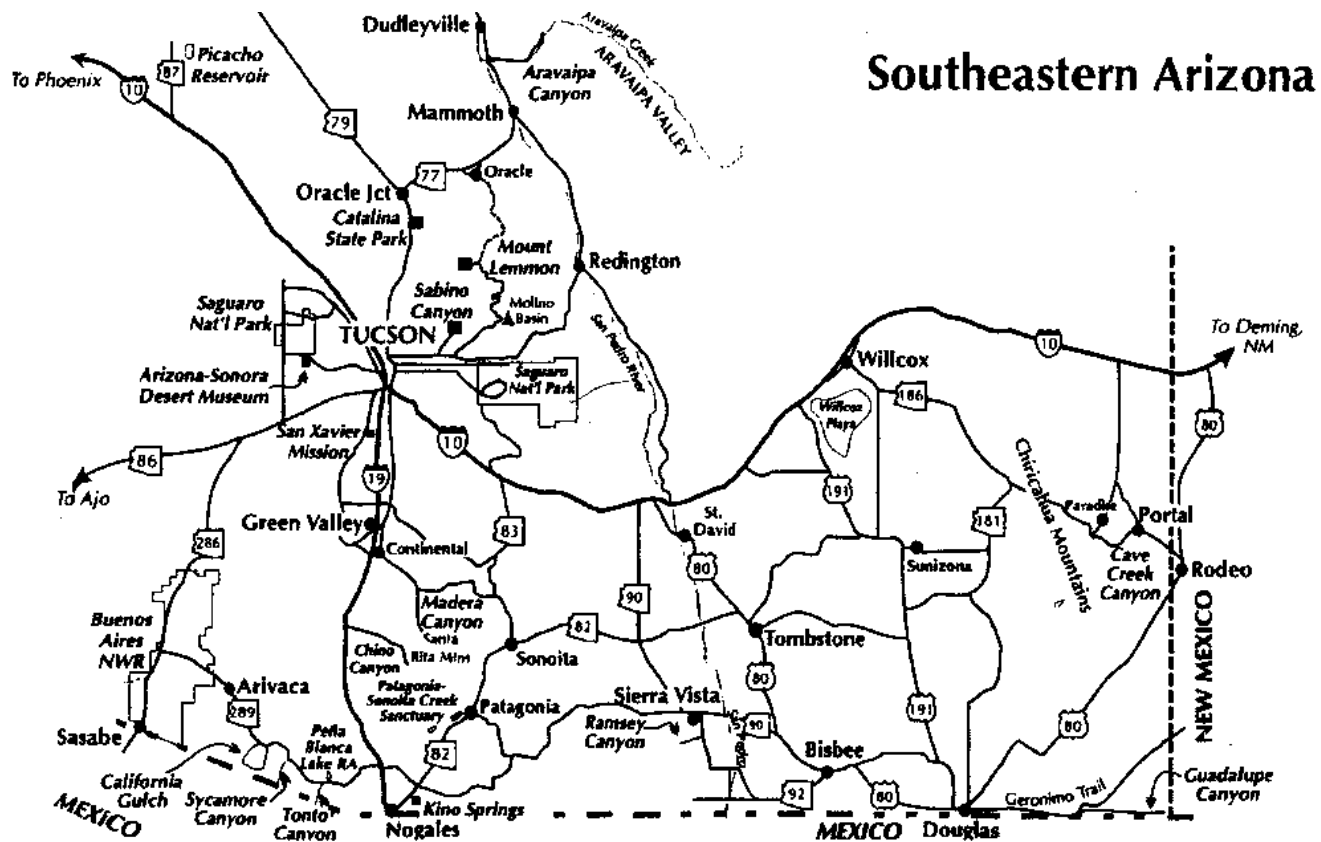
Barcelona Room

October 24, 2007

SESSION II		
AGRONOMY, FORAGE CROPS AND DAIRY	1:30-1:45 p.m.	<i>Forage Kochia (Kochia prostrata) Used in Winter Grazing for Beef Cattle</i> A.R. Wall, Utah State University
	1:50-2:05 p.m.	<i>Using Farm Demonstration Practices to Increase the Adoption of No-Till Farming Practices</i> W.E. Flanary, University of Missouri
	2:10-2:25 p.m.	<i>International Dairy Extension in Siberia</i> T.W. Downing, Oregon State University
	2:30-2:45 p.m.	<i>Timing of Dormancy Influence on Timothy (Phleum pratense) Corm Carbohydrate Storage and Drought Tolerance</i> T.H. Hudson, Washington State University
EXTENSION PROGRAMS AND METHODS	2:50-3:05 p.m.	<i>Small Engine Day Camp</i> B.M. Kitchen, Utah State University
	3:05-3:20 p.m.	<b>BREAK</b>
	3:20-3:35 p.m.	<i>West Nile Virus Spanish Education Program</i> J.R. Findlay, University of Idaho
	3:40-3:55 p.m.	<i>The Farm and Ranch Survival Kit Program</i> B.V. Tuck, Oregon State University
COMMUNITY RESOURCE DEVELOPMENT	4:00-4:15 p.m.	<i>Website to Connect Local Consumers with Direct Farm Marketers</i> J.C. Dale, Growing Business Solutions
	4:20-4:35 p.m.	<i>New Study Defining Rural Clientele for Extension in the West</i> T. Rahman, University of Arizona
	4:40-4:55 p.m.	<i>Global Dynamics South of the Border – A Project CENTRL International Study Tour in Sonora, Mexico</i> E.O. Rhodes, University of Arizona

# Field Trip Information

## Map of Area



### Field Trip Stops

#### Green Valley Pecan Co. (FICO)

1525 E. Sahuarita Rd., Sahuarita, AZ, 85629

The Green valley Pecan Company's 5000 acre Pecan Orchard is the world's largest irrigated pecan orchard. They grow & process pecans that are world renowned for their farm to table freshness. Retail store offers a nice variety of pecan products.

#### ZZ Cattle Company and Santa Fe Ranch

Rio Rico, AZ

#### Packing House

Nogales, AZ

#### Historic Tubac, AZ

Tubac was established in 1752 as a Spanish presidio (fort). Working artists' studios now surround the grounds which once served as the home for a Spanish military garrison. Tubac remembers its origins at the Tubac Presidio State Historic Park located in the village's Old Town. Tubac's meandering streets, and a full day can be enjoyed wandering through the numerous art galleries, working studios and gift shops.

Western Region County Agents  
PROFESSIONAL IMPROVEMENT CONFERENCE

PRESENTATION ABSTRACTS  
IN ALPHABETICAL ORDER  
BY PRESENTING AUTHOR



***County Agents View an Introduced Lovegrass***

Photographer unknown.  
January 1940.

Caption on photo:  
"County Agents Annual Cattlemen Tour. Stop #11.  
Small group of visitors examining the revegetation work  
being done by the SCS [Soil Conservation Service] at Desert Tank area."

## BIOLOGICAL WEED CONTROL EFFORTS AND RESULTS

Barnhill\*, J.V.

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[jamesb@ext.usu.edu](mailto:jamesb@ext.usu.edu)

Invasion by exotic plant species is considered one of the most significant ecological threats of our time. Many of these introduced species are so aggressive they become the dominant species in an area. These weeds often cause a decrease in the forages used by livestock and wildlife. They can reduce biodiversity and frequently increase soil erosion. Weeds such as diffuse knapweed (*Centaurea diffusa*), leafy spurge (*Ephorbia esula*), yellow starthistle (*Centaurea solstitialis*), purple loosestrife (*Lythrum salicaria*) and saltcedar (*Tamarix ramosissima*) pose a significant threat to the ecosystem. They often grow in sensitive or rugged areas that make herbicide treatment difficult. The vast areas that they infest can make control with pesticides economically impractical. Biological control is often the only feasible way to bring these weeds into balance with the environment. Seven insect species were released on diffuse knapweed and gave excellent control in three years. Four species that appeared to be the most effective were *Larinus minutes*, *Sphenoptera jugoslavica*, *Agapeta zoegana*, and *Cyphocleonus achate*. Six species were released on leafy spurge. The various *Aphthona* flea beetle species and *Oberea erythrocephala* seemed to work the best. Four species were released on yellow starthistle. The seed head weevils, *Bangasternus orientalis* and *Eustenopus villosus*, had the greatest effect. Three species were released on purple loosestrife. The *Galerucella californiensis* leaf feeding beetles and *Hylobius transversovittatus*, stem boring weevil, provided good control. The *Diorhabda elongate* leaf feeding beetle was recently approved for release on saltcedar. Significant results were observed 45 days after releasing this insect.

## “A TASTE OF TECHNOLOGY”- ADVANCED MASTER GARDENER TRAINING

Call\*, R.E.

Horticulture Agent, University of Arizona, Cooperative Extension, 450 S. Haskell Ave., Willcox, AZ 85643,  
[recall@ag.arizona.edu](mailto:recall@ag.arizona.edu)

Master Gardener volunteers (MGV) enjoy learning and increasing their skills. Advanced training for MGV is a method to keep trained personnel actively involved in this program. A five week, hands-on, advanced training course entitled, “A Taste of Technology,” was begun on January 25<sup>th</sup>, 2006. The objective of the training was to improve the knowledge and skill sets of MGV, enabling them to be more effective. Classes met in the Computer Laboratory at the University of Arizona, South (UAS) Campus once a week for up to three hours. Topics were: desktop computer hardware components and software programs; emailing; web browsing and searching; webpage design and posting; digital photography and enhancement; GPS/GIS usage; and PowerPoint® presentation construction and delivery. Presentations were made by Extension personnel and MGV. The average attendance for each session was 16 MGV. Evaluations were all positive with an overall rating of 4.6, on a scale of 1 (low) to 5 (high). MGV now maintain the Cochise County Master Gardener Website- <http://ag.arizona.edu/cochise/mg/>. They create and deliver educational PowerPoint® presentations. Digital photography is used to archive images of pests and other problems in a database. All communications for the MGV Program are performed electronically. Over 625 subscribers of the monthly newsletter are notified using email and only 250 paper copies are produced and mailed, a decrease of 71%. GPS/GIS programs are being used to list locations of ornamental plants on the UAS.



## **WEBSITE TO CONNECT LOCAL CONSUMERS WITH DIRECT FARM MARKETERS**

Dale\*, J.C.<sup>1</sup>, Tronstad, R.<sup>2</sup>, Teegerstrom, T.<sup>3</sup>

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<sup>2</sup>Specialist and Professor, University of Arizona, Dept. of Ag. & Resource Economics, 1110 East James E. Rogers Way, Tucson, AZ 85721-0023, [tronstad@ag.arizona.edu](mailto:tronstad@ag.arizona.edu)

<sup>3</sup>Associate Specialist, University of Arizona, Dept. of Ag. & Resource Economics, 1110 East James E. Rogers Way, Tucson, AZ 85721-0023, [tteegers@ag.arizona.edu](mailto:tteegers@ag.arizona.edu)

The Farm Directory Information System (IS) ([www.farmdirectory.org](http://www.farmdirectory.org)) links consumers with producers through Internet indexing services like Google.com™ and Yahoo.com™. The Farm Directory IS codifies delegated account administrative capabilities, aggregate growing calendars, farmers' market manager resources, events management, and integration with The Internet's #1 search engine, Google.com. In the Farm Directory IS, local account administrators oversee configurable geographic regions (e.g., county or a certain range of zip codes) to verify the accuracy of the information submitted by producers. Cooperative Extension Agents and Faculty oversee geographic regions. They know farms within their regions, products produced, and important contacts, making them the ideal custodian of the consumer-centric data in the Farm Directory IS. The Farm Directory IS expands production information as a force-multiplier for producers, who input specific growing calendar information including products produced and production states (e.g., planting, harvest, active harvest, end harvest). Within a variable radius from any zip code in the Southwest, consumers reach Farm Directory IS producer information through a search by date, product, farmers' market, or farm events. Farmers' market managers input a farmers' market location and associated producers/vendors. Using Google.com web services, the Farm Directory IS regularly re-indexes producer records, reducing the 'stale data problem' inherent in many existing directories. Search results include updated information and provide a valuable breadth of consumer-focused information in near real-time, making the Farm Directory IS a progressive solution for direct farm marketing.

## **INTERNATIONAL DAIRY EXTENSION IN SIBERIA**

Downing\*, T. W.

Dairy Extension, Oregon State University, 2204 4<sup>th</sup> St., Tillamook, OR 97141, [troy.downing@oregonstate.edu](mailto:troy.downing@oregonstate.edu)

Conducting international extension programs continues to be encouraged and rewarded in Oregon. The past three years I have had the opportunity to conduct four separate trips to Siberia working with ten different farms, in addition to teaching at Krasnoyarsk State Agrarian University and at the Krasnoyarsk State Animal Breeding Station. Each assignment had specific items the dairies wanted addressed. The problems identified ranged from nutrition/minerals, forages, reproduction and breeding, and herd health. The first trip I went prepared to offer assistance specifically on the main issue identified. I brought dairy technical guides in Russian, many videos and some equipment used for demonstration purposes. I learned the first trip that they needed help with almost everything and it was important to be prepared to talk about any issue without much notice on any given day. Often, what I was asked to work on was not the most significant issue for the dairy. Before my last three trips, I developed small power point presentations with graphs and figures converted to metric to use in small group teaching. I also brought computer ration balancing software and taught many dairies how to effectively balance rations themselves. Formal lectures were offered using my computer screen and an interpreter as the means of teaching. This has been extremely well received and appreciated. Access to educational information is limited, even with the faculty at the university. Overall, working internationally has been extremely rewarding for me and those I have been able to work with.

## WEST NILE VIRUS SPANISH EDUCATION PROGRAM

Findlay\*, J.R.<sup>1</sup>, Jones, W.<sup>2</sup>

<sup>1</sup>Extension Educator, University of Idaho, P.O. Box 4228, Pocatello, Idaho 83205, [rfindlay@uidaho.edu](mailto:rfindlay@uidaho.edu)

<sup>2</sup>Extension Educator, University of Idaho, 2925 Rollandet, Idaho Falls, Idaho 83402, [wjones@uidaho.edu](mailto:wjones@uidaho.edu)

The 2007 University of Idaho Potato School included a section of workshops for Spanish speaking farm workers. All the classes were taught in Spanish and were developed with farmer and farm worker input. The Spanish session included a class designed to assist farm workers in assessing and mitigating the risks associated with West Nile Virus (WNV). Information shared was collected from the Idaho Department of Health and Welfare, Idaho Department of Agriculture, Idaho Fish and Game, Idaho State Parks and Recreation, and the National Center for Disease Control. Farm workers were taught the difference between viruses and bacteria, and how WNV is transferred. Students were also taught about the difference in virus virulence when WNV infects various insects and other animals. Rates of infection for humans as opposed to horses were discussed. A list of symptoms of WNV infection was given as well as a list of the more grave complications that can arise from this disease. The students were allowed to study maps of infection rates in Idaho. This helped the students assess their risk of contracting WNV. A list of recommendations for the protection of farm workers were given. This list was divided into recommendations that are the primary responsibility of the employer and those that are the responsibility of the employee. All students received a list of web sites, and contacts where they could receive more information in Spanish concerning WNV. Spanish Lectures have been offered at the UI Potato School for the past six years. All students have been evaluated with pre and post tests. The results of these tests have shown considerable improvement in knowledge following the program.

## USING FIELD DEMONSTRATIONS TO INCREASE THE ADOPTION OF NO-TILL FARMING PRACTICES

Flanary\*, W.E.<sup>1</sup>, Crawford, J.J.<sup>2</sup>, Kelly, R.A.<sup>3</sup>, Schleicher, A.D.<sup>4</sup>, Chapple, R.W.<sup>5</sup>

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<sup>2</sup>Coordinator of Graves-Chapple Farm, University of Missouri Extension, 201 Hwy. 136 East, Rockport, MO 64482, [crawfordj@missouri.edu](mailto:crawfordj@missouri.edu)

<sup>3</sup>Ag Business Specialist, University of Missouri Extension, 4125 Mitchell, St. Joseph, MO 64482, [kellyr@missouri.edu](mailto:kellyr@missouri.edu)

<sup>4</sup>Livestock Specialist, University of Missouri Extension, 201 Hwy. 136 East, Rockport, MO 64482, [schleicher@missouri.edu](mailto:schleicher@missouri.edu)

<sup>5</sup>Retired Ag Engineering Specialist, University of Missouri Extension, 400 E. Cass St. Rockport, MO 64482

Northwest Missouri is one of the most erosive regions in the United States with annual cropland soil losses exceeding 100 tons per acre without conservation practices. Surveys indicated growers did not realize the rate of soil loss from their farm fields and the long-term consequences. For the past 19 years, the University of Missouri Extension, has provided key field demonstrations that were instrumental in the adoption of no-till cropping systems and maintaining crop residues to protect soil from erosion. Field demonstrations were initially designed to address grower concerns so no-till adoption would proceed. Growers were concerned that the adoption of a no-till system would reduce crop yields and increase production costs. Extension's strategy was to create a twenty-two acre no-till farming systems demonstration site established in 1988. All field demonstrations at this site were planted using no-till practices. Key demonstrations included soil erosion plots which showed soil loss from different tillage systems. Also, different tillage systems were compared side-by-side to provide growers confidence that changing to no-till would not reduce yields and provided management information how to successfully no-till. Nitrogen management research was conducted by State Extension staff showing which nitrogen sources were more consistent than others. Other demonstrations included phosphorus and potassium fertilizer application methods, corn and soybean herbicide treatments, pest control strategies and many other no-till related demonstrations. The site continues to be a source of information for no-till practices and the educational impact can be easily shown. In 1988, less than 7 percent of the growers in Holt County were no-tilling according to a survey Extension conducted. Currently, more than 80 percent of the highly erodible land in Holt County is farmed using no-till practices according to Natural Resource Conservation Service.

## EXTENSION'S ROLE IN FEDERAL LAND USE PLANNING IN UTAH

Gale\*, J.A.

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The USDI Bureau of Land Management (BLM) and USDA Forest Service (USFS) are updating their land use plans in Utah. These federal agencies are required by federal law to “consider” the content of county land use plans as they develop land use plans and make management decisions. They have undertaken multi-year, multi-million dollar planning efforts. Relationships between local government in western states, federal land management agencies, and environmentalists are often combative as a result of decades of deep-seated conflict over “multiple use” vs. “preservation”. The most contentious issue in the battle is wilderness, but several other issues also generate controversy: road policy, off highway vehicle (OHV) management, grazing, and development of mineral and energy resources. County governments have entered into “Cooperating Agency” status agreements with these agencies. This formal relationship has provided the counties a seat at the table as these plans have been drafted. Though not yet complete, the counties have had a significant impact on the BLM’s proposed draft Resource Management Plan (RMP) and the USFS’s Comprehensive Evaluation Report (CER). USU Extension is assisting by providing a traditional role in this non-traditional politicized program. Extension enabled the University to obtain \$785,000 to conduct various reviews of draft Environmental Impact Statement (EIS) documents and to conduct a major university research project to obtain new baseline socio-economic data in the state.

## LAND APPLICATION OF BIOSOLIDS TO RESTORE DISTURBED WESTERN RANGELANDS

Greenhalgh\*, L.K.<sup>1</sup>, McFarland, M.J.<sup>2</sup>, Vutran, M.<sup>3</sup>, Vasquez, I.R.<sup>4</sup>, Schmitz, M.<sup>5</sup>, Brobst, R.B.<sup>6</sup>

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<sup>3</sup>Graduate Student, Department of Civil and Environmental Engineering, Utah State University, Logan, UT 84322, [maianhvutran@cc.usu.edu](mailto:maianhvutran@cc.usu.edu)

<sup>4</sup>Graduate Student, Department of Civil and Environmental Engineering, Utah State University, Logan, UT 84322, [vasquezromero@hotmail.com](mailto:vasquezromero@hotmail.com)

<sup>5</sup>Biosolids Program Manager, Utah Department of Environmental Quality, Salt Lake City, Utah 84114, [mschmitz@utah.gov](mailto:mschmitz@utah.gov)

<sup>6</sup>Biosolids Program Coordinator US Environmental Protection Agency Region 8, Denver, Colorado 80202, [Brobst.bob@epa.gov](mailto:Brobst.bob@epa.gov)

Biosolids land application represents a cost effective approach for enhancing the environmental health and productivity of marginal and disturbed rangelands in the western United States. The impact of land applying aerobically digested (ArD), anaerobically digested (AnD) and lime stabilized biosolids (LSB) to restore marginal rangelands was evaluated in the current study. While an average dry matter yield of 84.1 lbs./A was recorded for rangeland control plots, the dry matter yield for rangeland plots receiving ArD, AnD and LSB ranged from 131.0 to 664.1 lbs./A. Forage grown on biosolids-amended rangelands showed maximum crude protein contents of 19.7%, 15.3% and 20.2% for ArD, AnD and LSB land application sites, respectively, compared to 10.2% for control plots. Increases in dry matter yield and forage nutritional value underscore the value of biosolids land applications for both restoring disturbed rangeland and supporting sustainable ranching activities. Invasive species dominated forage both before and after treatment. Future work may include seeding with native and other beneficial species, to provide better quality forage, fire strips and carbon sequestration.

## TIMING OF DORMANCY INFLUENCE ON TIMOTHY (*Phleum pratense*) CORM CARBOHYDRATE STORAGE AND DROUGHT TOLERANCE

Hudson\*, T.H.<sup>1</sup>, Fransen, S.J.<sup>2</sup>

<sup>1</sup>Rangeland/livestock management educator, Washington State University Extension, 507 Nanum St., Rm. 2, Ellensburg, WA 98926, hudson@wsu.edu

<sup>2</sup>Forages specialist, Washington State University Extension, 24106 Bunn Rd., Prosser, WA 99350, fransen@wsu.edu

Timothy (*Phleum pratense*) is a cool-season grass commonly grown for hay. Timothy is the primary cash crop in the irrigated Kittitas Valley, with farm gate values reaching \$250/ton. Ninety percent of the timothy hay grown in Kittitas County is exported to Pacific Rim countries to be fed to racehorses and dairy cattle. Timothy is unique among cool-season grasses in that it has a bulbous corm at the base of the culm which stores carbohydrates used for regrowth following defoliation. The quantity of carbohydrates stored in the corm changes predictably through the growing season. The increasing frequency of drought and more severe shortages of irrigation water pose management questions regarding proper agronomic practices, in a plant known to be drought-intolerant, for which there is no published guidance. Research plots established in May of 2005 were designed to provide quantitative data indicating how the timing of dewatering and subsequent early dormancy affect carbohydrate dynamics and to determine what effects these changes have on plant survival and stand longevity. Final research data from the 2005 growing season and spring of 2006 revealed a strong correlation between water-soluble carbohydrate concentration in the crown and survivability. The results also exhibited unexpected varietal responses but little difference between mature and seedling stands. Farmers experiencing shorter rotations due to crop quality problems will be increasingly dependent on sound management to maintain profit margins; the results of this research will enable grass hay farmers to prevent stand loss and increase stand longevity during water-short years.

## SHADE TOLERANT, LOW WATER-USE PLANTS FOR THE ARIZONA HIGH DESERT

Jones\*, C.K.

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The Gila County Master Gardeners completed a desert landscaping project for an interior courtyard called the Serenity Demonstration Garden in 2006. Forty-five ornamental plant species were researched and compiled for planting. Twenty-two species were planted that September. Plant criteria included shade tolerance, low water use, and minimum hardiness (Sunset Garden Zone 10 – 10°-15° Fahrenheit). In addition, the site's compact soils, mature pine overstory, and poorly controlled supplemental watering also presented special challenges. Horticultural specialist Kim Stone from the University of Arizona's Boyce Thompson Southwest Arboretum was consulted to confirm the appropriateness of each species. From the demonstration, the most significant observation was that the more light each "shade tolerant" species received, the better they performed. Under the conditions of the demonstration garden, the best performers included *Anisacanthus quadrifidus* var. *wrightii*, *Bulbine frutescens* 'Hallmark', *Heuchera sanguina*, *Manfreda maculosa*, *Muhlenbergia dumosa*, *Nandina domestica*, and *Salvia greggii*. Others that performed well with better light conditions included *Gaura lindheimeri* 'White', *Muhlenbergia emersleyi* 'El Toro', *Penstemon pseudospectabilis*, and *Penstemon superbus*. Plants that did not fare well under the site conditions included *Amsonia grandiflora*, *Verbena peruviana*, *Zephyranthes grandiflora*, and *Zephyranthes candida*.

## THE EFFECT OF SALINITY ON CACTI AND SUCCULENTS

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Irrigation water salinity exposes cactus and succulents to potential damage from salt build-up. We conducted a study to investigate the impact of salinity on several commonly used landscape cacti and agave. Two species of cacti, *Carnegiea gigantea* (saguaro) and *Echinocactus grusonii* (golden barrel cactus), *Fourquiera splendens* (ocotillo), a desert shrub and *Agave parryi truncata* (Gentry's agave) were evaluated for the effect of increasing salinity in the irrigation water. The experiment was conducted in full sun at the University of Arizona, Campus Agricultural Center in Tucson, Arizona. Plants were irrigated with a mixture of calcium chloride and sodium chloride to obtain salinity levels of 0.6, 5.0, 10.0, and 15 dS/m (EC). After 18 weeks of treatments for saguaro and 26 weeks for the other species, root and shoot dry weight, shoot fresh weight, and moisture content were recorded. Root and shoot weight of ocotillo decreased 40% and 47% respectively as salinity increased from 0.6 dS/m to 5.0 dS/m. Agave shoot and root dry weights decreased approximately one third when EC of irrigation water increased from 0.6 dS/m to 5.0 dS/m. Shoot fresh weight decreased for all species with increasing salinity. However, as salinity of irrigation water increased saguaro root fresh and dry weight increased. Barrel cactus sequestered Na and Cl ions in greatest amounts in shoot tissue, followed by saguaro. Agave and ocotillo relied on exclusion of sodium and chloride although concentrations increased with increasing salinity in the irrigation water.

## SMALL ENGINE DAY CAMP

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The Uintah County 4-H program conducts several day camps each summer to introduce youth to new project areas. The small engine day camp has been popular among boys and girls. The desired outcomes include: youth will learn how an engine works; youth will learn how to conduct a basic engine tune-up; and youth will learn the importance of engine lubrication. Activities include parts identification, tool identification, engine tear down, a how-it-works demonstration, differences between 2-cycle and 4 cycle engines, and basic engine tune-up. The ideal duration of the camp depends on age. Three hours is sufficient for ages eight to ten. Four or more hours may be appropriate for older youth. A local shop donates old engines for tear down. Five dollars is charged for the camp. A pair of safety glasses is provided to be worn by the youth while working on engines. This day camp helps youth gain work related skills they can use at home and as they begin to enter the job market, especially doing yard work.

## EFFORTS TO CONTROL BERMUDAGRASS DISEASES ON A GOLF COURSE GREEN

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For many years, a Tifton 328 ('Tifgreen') bermudagrass golf course green has been infected with a chronic disease syndrome caused by bermudagrass decline (*Gaeumannomyces graminis* var. *graminis*), *Fusarium* blight and foliar infections caused by *Bipolaris* and *Curvularia*. Previous attempts by this golf course to control these diseases with fungicides have been unsuccessful. From January to March 2005, a fungicide evaluation was conducted on this golf green with Heritage, Daconil, Chipco 26GT, Eagle, Banner Maxx and Cleary 3336 with none being effective. Subsequently, a field day and disease identification workshop were held for 16 stakeholders. Eight people who responded to an evaluation indicated their knowledge on these diseases increased by 40.7% and planned to use this information. Seven said their knowledge on these fungicides improved by 38.3%. Since chemical controls were ineffective, an overseeding trial with bentgrasses ('Penn A-1,' 'Penn A-4,' 'Penn G-6,' 'Brighton') to culturally control these diseases was conducted in May 2006. Currently, 'Penn A-1' and 'Brighton' plots have approximately 50% coverage followed by 'Penn A-4' (25%) and 'Penn G-6' (10%), which have been unaffected by these diseases. Shortly, this green will be reseeded with 'Brighton' to obtain better coverage and to determine if this cool-season bentgrass is feasible for this golf course. Twelve people attended a field day on September 13, 2007 to observe this overseeding project, an evaluation of 28-bentgrass cvs. and a fungicide phytotoxicity trial with Trinity, Bayleton and Banner. Eight people who responded to an evaluation indicated their knowledge on bentgrasses increased by 66.4%. Two people will use this information in a month, three plan to use it sometime in the future and three were unsure. On a scale of 1 (not relevant) to 10 (extremely relevant) this project received a rating of 6.9. Seven people said their fungicide knowledge improved by 54.3%. Three people will use this information in a month, three plan to use it sometime in the future and two were unsure. This project received a 7.1 score based on the above rating scale. Overall, everyone wanted these turfgrass projects to continue. Pesticide credits from the Hawaii Department of Agriculture and Golf Course Superintendents Association of America educational credits were provided for both field days.

## EVALUATION OF PREVENTATIVE ALFALFA WEEVIL CONTROL

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Many alfalfa producers have incorporated the practice of applying the insecticide 'Furadan' (carbofuran) as a preventative alfalfa weevil control practice. Producers often say that fields not treated with insecticide are slower to recover and have a lower second crop yield than fields treated under similar growing conditions. Trials were conducted in different Utah counties in 2004, 2005 and 2006. The procedure for all the trials was Furadan applied approximately 60 days prior to the first crop harvest. Fields were sampled twice before the first cutting and twice before the second cutting. In all three years Furadan was effective in reducing weevil numbers. The average number was well below the current threshold level of 20 per sweep. According to collected data, most fields in Utah would not need spraying for alfalfa weevil. We suggest more research is needed. Perhaps the generally accepted threshold level 20 alfalfa weevil is too high considering today's alfalfa hay prices and cost of insecticides.

## NEW STUDY DEFINING RURAL CLIENTELE FOR EXTENSION IN THE WEST

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The principal objectives of this presentation are: (1) to characterize potential Extension clientele in the West; (2) to identify their sources and extents of their perceived vulnerability; and (3) to identify effective methods for delivering Outreach education. The empirical analyses for the presentation were conducted by using Farm Survey Data from 2,645 farm operators in states of Arizona, Colorado, and Wyoming targeting farm operations with annual sales of less than \$50,000. The survey was conducted in 2006 by the authors of this paper through the National Agricultural Statistics Service (NASS) of the U.S. Department of Agriculture.

The total response rate was 53.6%. A total of 2,645 surveys were completed, which is the sample size of our empirical analyses. Data were collected on small operator's demographics, sources of risks, information sources and preferences, resource management, and income status. This enabled us to empirically examine and identify new clientele with respect to their socioeconomic status.

Our preliminary findings suggest that new clientele are farm operators who never received information from Cooperative Extension, those at financial and production risk, and operators whose farm income accounts for more than 50% of the total household income. The results show that there is disconnect between the farmer's own assessment of educational needs, and the educational content being offered by the educators. Also we find that the most preferred medium for receiving outreach education in the West are print publications mailed directly to them, rather than the current emphasis on delivering education through workshops and web media.

## GLOBAL DYNAMICS SOUTH OF THE BORDER – A PROJECT CENTRL INTERNATIONAL STUDY TOUR IN SONORA, MEXICO

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The states of Arizona, USA and Sonora, Mexico are strategically aligned as southwest region business partners. Arizona's entire southern boundary is shared with Sonora. Development of the Canamex corridor and expansion of the Pacific Port at Guaymas provide a stronger link of commerce between the Arizona-Sonora region and a global marketplace. In order to focus on these dynamics and more, a CENTRL board decision to conduct the first International study tour into Southern Sonora was made in January of 2004. In preparation for the seminar, two planning trips were made to Ciudad de Obregon by the authors and several CENTRL board members. A series of planning sessions were held with the President of the Institute of Technology in Sonora (ITSON) and his administrative staff. The two objectives established for the seminar were: 1) To gain first-hand perspectives on the education, economy, community, and diverse lifestyles in Mexico; and, 2) To study a proven model of outreach education between the business community of Sonora and ITSON University. A CENTRL delegation of thirty-one participated in a Class XVIII seminar in Mexico on May 2-6, 2006. Highly favorable evaluations and the proven success of the seminar resulted in making a Mexico study tour an integral part of Project CENTRL's two-year program. Plans are underway for conducting the second International seminar with our Sonoran neighbors and CENTRL Class XIX on May 6-10, 2008.

## **BUILDING THE CAPACITY OF THE YAVAPAI COUNTY MASTER GARDENER PROGRAM THROUGH VOLUNTEER ENGAGEMENT**

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Between 1998 and 2006, the Yavapai County Master Gardener Program has increased the numbers of clients served, active Master Gardener volunteers, and documented volunteer service hours. The increased participation and clientele service can be attributed to multiple factors which include the Arizona Highlands Garden Conference, web-based resources (monthly newsletters, electronic volunteer reporting, and meeting information), volunteer recognition events, introduction of continuing education requirements, formation of a Master Gardener Association, formalized volunteer coordination and a mentoring program. During the same period, Master Gardener service hours increased by 374%, number of clients served increased by 217% and the dollar value of volunteer service to Yavapai County communities increased by 511%. Formalized volunteer coordination (provided by Master Gardener volunteers) was critical to achieving these increases in service and associated dollar values. These data indicate that by providing expanded educational opportunities and volunteer recognition, adding electronic reporting, and creating opportunities for social networks, Yavapai County Master Gardeners are more likely to remain engaged and provide increased service to their communities.

## **THE FARM AND RANCH SURVIVAL KIT PROGRAM**

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The Mid-Columbia River area between Washington and Oregon is home to a rich variety of commercial agricultural enterprises. Small acreage owners are increasing in numbers also. Extension educators in the region have partnered to deliver financial management educational programs to producers, but attendance was historically low. Brainstorming with a local ranch manager, Extension created the Farm and Ranch Survival Kit (FRSK), an educational series delivered to producers at home in a convenient and non-threatening format. The project received funding from the Western Center for Risk Management Education (WCRME). The main goal was to increase producers' knowledge base on key financial topics to promote informed decision making. A direct mailing about the program was sent to agricultural, timber and open-space acreage owners in a five-county of the Mid-Columbia area; 165 people enrolled in the program. Educational installments were created on the topics of business planning, financial planning, interpersonal relations, farm succession planning, tax and insurance planning and marketing. These publications were sent to program participants and placed on the project Web site at <http://extension.oregonstate.edu/wasco/smallfarms/RiskManagement.php> for access by wider audiences. Eleven workshops on a variety of related topics were held in conjunction with the FRSK program. FRSK program materials are now being used by other educators throughout the country. Participants reported they had become much more knowledgeable about farm financial management and had taken several financial management action steps. In the words of one participant, "I feel like I went from knowing nothing to be able to make intelligent decisions."



## FORAGE KOCHIA (*Kochia prostrata*) USED IN WINTER GRAZING FOR BEEF CATTLE

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One challenge facing beef producers in the Western United States is finding ways to maximize low-quality forage utilization by cattle, but minimize the use of extensive supplements. One way to do this is to include forbs and shrubs in low quality forage-based diets to reduce protein supplementation, particularly in winter grazing systems. Forage kochia increases the nutritive value of grazing-animal diets by increasing crude protein levels. This study investigated the nutritional value of forage kochia and a low-quality forage diet by conducting an *in vivo* metabolism trial with ruminally cannulated beef steers and measured diet quality, N balance, rumen NH<sub>4</sub>, passage rate; retention time; digestibility; intake; energy; content of varying levels of forage kochia and tall wheatgrass. When forage kochia was fed with tall wheatgrass straw (modeling winter grazing) to beef steers, it increased diet quality, the amount of N and energy available in their diets. Forage kochia contains crude protein levels that meet microbial requirements and allows microbes to digest fiber in the tall wheatgrass straw. Improving grazing is important economically because it can reduce winter feed costs, especially to ranchers feeding stored hay.

## THE RIPARIAN EXTENSION PROGRAM IN ARIZONA

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Riparian areas are often called “ribbons of green.” These green ribbons have many different uses and stakeholders with diverse perceptions of their importance and proper use. This makes managing these areas in some cases very complex. Developing a strong Extension program that can provide research-based information to the various riparian stakeholders can facilitate better management and help preserve these riparian areas. To accomplish this goal, the Riparian Extension Program of the University of Arizona has: 1) conducted educational workshops, 2) developed educational publications, and 3) developed a web-based educational module. Workshops are very important because of the personal interaction with the different stakeholders who are interested in riparian areas. Five different types of workshops have been held to capture the various stakeholders. Topics presented at the workshops ranged from general information on riparian areas and their processes to more specific topics such as methods for monitoring ungulate impacts and even cutting edge scientific topics such as climate change and riparian areas. In addition, to complement these workshops two Extension publications have been developed. The first one focused on general concepts and processes of riparian areas in Arizona while the second focused on functions and processes of streams that have a major influence on riparian areas. Finally, distance learning is becoming more and more popular; to accommodate this need a web-based educational module on riparian areas was developed.