STUDENT RESEARCH JOURNAL
JORDAN COLLEGE

Research Newsletter, Vol. 1, Issue 2 Fall 2016

Message From The Editorial Team

We successfully launched the first issue of the Jordan College Student Research Journal. Most of the contributions were from the Plant Science Department, but we would like to welcome contributions from all of the departments in the college. The goal of this journal is to showcase undergraduate and graduate student research in the Jordan College at California State University, Fresno and share news of student activities and success stemming from their research projects.

We continue to invite interested faculty and students (graduate or undergraduate) from all departments in the Jordan College to serve on the editorial team as we wish to see a broader representation. Contributions from students in the form of abstracts or full-length articles are most welcome. We welcome comments, suggestions, and contributions in the form of articles, abstracts or research news.

Upcoming research-related events - Spring 2017 in California

Jan. 18-20	California Weed Science Society Annual Mtg. Monterey, CA (www.cwss.org)
Jan. 31-Feb. 1	Calif. Plant and Soil Conference, Fresno, CA (calasa.ucdavis.edu).
Feb. 15	ASABE California/Nevada Section, Tulare, CA (http://www.asabe.org/meetings-events/2016/02/californianevada-annual.section-meeting.aspx)
April 18-19	Central Calif. Research Symposium, Fresno, CA http://www.fresnostate.eduacademicsgrantsprograms/students/symposium.html.

IN THIS ISSUE

USDA-NIFA-NLGCA GRANTEE

Student interns in the USDA-NIFA-NLGCA funded project titled 'Promoting undergraduate research in agriculture: opportunities for experiential learning and a pathway to graduate studies were successfully placed with researchers at several institutions. Several of them have completed their internships while some will be doing so soon. Some of the projects these interns were involved in include the following:

KATIE ASAI—Plant Science

Katie (far left) with the staff of the University of California, West Side Research and Extension Center, Five Points, CA.

Katie worked with Dr. Jeffrey Mitchell, Cropping Systems Specialist, Dept. of Plant Science, Univ. of California, Davis. The project was on 'determining macrofauna abundance and composition in no-till and cover cropped surface soils in the San Joaquin Valley'.

JESSIE BRAZIL—Plant Science

Jessie worked with Dr. Margaret Ellis, Plant Pathologist, Dept. of Plant Science, Fresno State. Her project was on 'characterization and movement of potential oomycete plant pathogens from Fresno Co. water sources to irrigation reservoirs at the University Agricultural Laboratory'.

MARK CASTANON - Plant Science

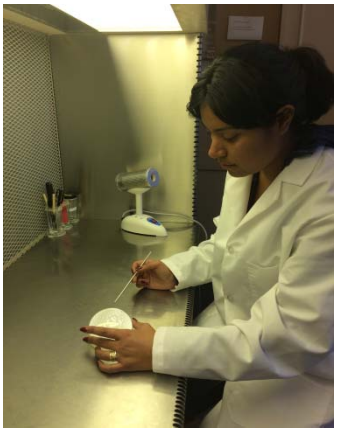
Mark worked with Dr. Andreas Westphal, Nematologist, Department of Nematology, University of California, Riverside. His project was on 'evaluating *Crotalaria* as a host for root knot nematodes'.

CAROLYN CHASE—Food Science

Carolyn worked with Dr. John Bushoven, Department of Plant Science, Fresno State and Jan Minami of Food Commons, Fresno. Her project was on 'healthy eating: education and outreach'

FOOD commons FRESNO

CRYSTAL ESPINDOLA—Biology/Plant Science



Crystal worked with Dr. Jacob Wenger, Entomologist, Department of Plant Science, Fresno State. Her project was on 'conservation of pollinators' with an emphasis on the effect of pesticides on microbial activity in nectar.

ALEXIS JACKSON - Plant Science

Alexis presenting her internship exp. to Plant Science Club members.

Alexis worked with Dr. Themis Michailides, Plant Pathologist, Department of Plant Pathology, University of California, Davis. Her project was on 'walnut and pistachio sap on spore germination and mycelial growth of *Neofusicoccum mediterraneum*, *N. parvum*, *Phomopsis* (Nomelini spp.), and *Diaporthe neothicola* (*Phomopsis neotheicola*)'.

MICHAEL SERRATO - Plant Science

Michael working on his project at the UC Kearney Ag Research and

Michael worked with Dr. Kent Daane, Entomologist, Department of Environmental Science, Policy, and Management, Unive. of California, Berkeley. His project was on 'A comparison of thermal performance between the two pupa parasitoids, *Pachycrepoideus vindemiae* and *Trichopria drosophile*'.

MAY YANG - Plant Science

May worked with Dr. Kent Daane, Entomologist, Dept. of Environmental Science, Policy, and Management, University of California, Berkeley and Dr. Ruth Dahlquist-Willard. Her project was on 'insect-weed interactions in agroecosystems'.

All these USDA-NIFA-NLGCA grantees will be presenting their research at professional society meetings. We wish them all the best for their presentations!!!

STUDENT RESEARCH ACTIVITY NEWS

Department of Child, Family, and Consumer Sciences

International Association for Cross-Cultural Psychology Biennial Congress

Fresno State post baccalaureate students Sarah Tsutsui and Seema Prakash of the Dept. of Child, Family, and Consumer Sciences presented an oral talk at the International Association for Cross-Cultural Psychology Biennial Congress in Nagoya, Japan held July 30-Aug. 3, 2016. Joining cross-cultural psychological scholars in a paper session devoted to religion, Sarah and Seema present the results of research they conducted in Dr. Jessica McKenzie's Human Development and Culture Lab. This work build upon the research they presented in an invited plenary session at the Central California Research Symposium in Fresno on April 20, 2016.

L-R: Seema Prakash, Sarah Tsutsui, and Dr. Jessica McKenzie, advisor

Areli Almaraz, Maribel Barragan, Natali Campos, Brenda Canchola, Maria Carrillo Rodriguez, Jessica Cisneros, Danae Dubberke, Aristides Aguilera Figueroa, William Evans, Alma Garcia, Karel Gonzalez, Tayler Kelley, Maria Martinez, Jazmin Mendez, Sara Rima, and Jennifer Vargas who are participants in the project..

Abriendo Caminos: A Community Health Promotion Program

Fresno State undergraduate students are currently working with Hispanic families in the community to increase knowledge of affordable ways to live a healthy life. Students meet with families on Saturdays during the semester to host educational workshops that focus on nutrition, family mealtimes, and joint physical activity.

They are collecting data at the beginning and end of the program, as well as at a 6-month follow-up to measure the impact of the program. Students presented their research at the Central California Research Symposium in Fresno on April 20, 2016 and several students will present their research findings at the upcoming 9th Biennial Childhood Obesity Conference. The students worked under their advisor Dr. Amber Hammons.

Department of Industrial Technology

Huy Le, an undergraduate student in Industrial Technology was awarded the prestigious USDA summer experiential learning scholarship in 2016. His area of research is in application of drones for site-specific crop management strategies for agriculture. He worked with Dr. Balaji Sethuramasamyraja, Program Director of Precision Ag Technology Minor and Ag. Systems Management major option in his Autonomous Systems Laboratory.

His objectives were to research the modification of commercial/civilian drones to be used for precision agriculture as a unmanned aerial platform using different types of sensors that would allow for better aerial reconnaissance and data collection from the ground. He plans to further research on these modified drones into his senior design project and later pursue it as the basis for his graduate degree in Industrial Technology at Fresno State.

Huy Le working on drone technology.

L-R: Georgina Reyes and Aldo Garcia displaying their poster at the ASA/CSSA/SSSA Annual Meeting in Phoenix, AZ.

Department of Plant Science

American Society of Agronomy/Crop Science Society of America/Soil Science Society of America (ASA/CSSA/SSSA) Annual Meeting, Nov. 6 - 9, Phoenix, AZ.

Undergraduate students Aldo Garcia and Georgina Reyes Solorio .presented a poster titled 'Recruited young students from underrepresented groups into agricultural sciences' in the ASA Extension and Education Section presentations.

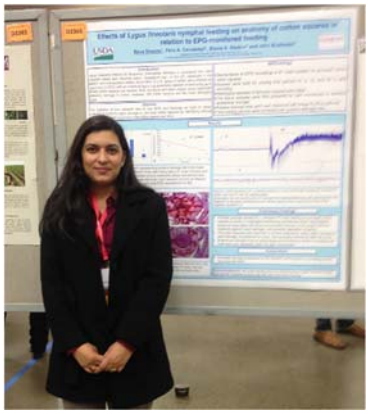
The following graduate students also presented posters at he ASA/CSSA/SSSA meetings in Phoenix, AZ.

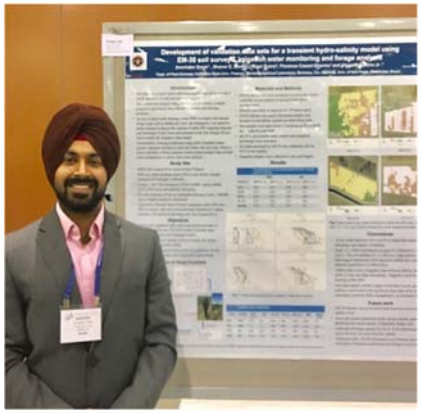
Jorge Angeles, poster titled 'Response of transplanted tomatoes to pre-plant herbicides'.

Amninder Singh, poster titled 'Soil salinity mapping using electromagnetic induction (EM-38) to provide input data for the Csuid-II Model, a Decision Support Tool for irrigation in saline water reuse areas'.

Touyee Thao, poster titled 'Nitrogen and water use efficiencies in drip-irrigated sugarbeets'.

Eeva Sharma, poster titled 'Effects of *Lygus lineolaris* nymphal feeding on anatomy of cotton squares in relation to EPG-monitored feeding' at the International Congress of Entomology, September 25-30, 2016, Orlando, FL.





Graduate students Eeva Sharma (left) and Amninder Singh (right) displaying their posters at the International Congress of Entomology, 2016, Orlando, FL and ASA/CSSA/SSSA Annual Meeting 2016, in Phoenix, AZ, respectively.

STUDENT ABSTRACTS

(*undergraduate student; **graduate student)

Response of transplanted tomatoes to pre-plant herbicides

Jorge Angeles*, Kurt Hembree, and Anil Shrestha*

Over the last two decades, processing tomato planting in the San Joaquin Valley has transitioned from deeper-tilled furrow irrigation systems to buried drip irrigation systems with shallower tillage. Initially, the use of pre-plant herbicides in this newer planting system was generally safe and caused no negative effects on plant health. However, in 2009, stunted tomato plants were discovered in fields that had been treated with pre-plant herbicides. It was suspected that the breakdown of pre-plant herbicides was facilitated more when deep tillage was done after harvest than under the new system. Therefore, greenhouse studies were conducted in Fresno, CA in summer 2014 and 2015 to assess plant injury to simulated residues of common pre-plant herbicides used in tomato production. The objective of these studies was to evaluate above- and below-ground response of potted tomato plants to pre-plant herbicides. The herbicides used were trifluralin, *s*-metolachlor, and pendimethalin at doses of 0, 0.5, 1, 2, 4, and 6 ppm in 2014. Results in the 2014 study showed that the herbicides inhibited root growth at residual rates of 1 ppm. Therefore, in 2015, the doses were reduced to 0, 0.03, 0.06, 0.12, 0.25, and 0.5 ppm. It was observed that all three herbicides caused reductions in root and shoot dry biomass at 0.5 ppm rates, with pendimethalin having a lower potential to cause injury than the other two herbicides. The GR_{50} for root biomass was estimated as 0.5 ppm for triluralin, s-metolachlor, and pendimethalin, respectively. In conclusion, this study helped identify soil residue levels of these herbicides that could be potentially cause crop damage.

Presented at the ASA/CSSA/SSSA Annual Meeting, November 6-9, 2016, Phoenix, AZ.

Soil salinity mapping using electromagnetic induction (EM-38) to provide input data for the Csuid-II Model, a Decision Support Tool for irrigation in saline water reuse areas

Amninder Singh*, Sharon Benes, Florence Cassel, Nigel Quinn, and Ulysses Bottino Jr.*

Soil salinity is a major factor affecting irrigated agriculture in today's world, especially in arid/ semi-arid regions like the Western San Joaquin Valley of California. In this area both salinity and drainage are limiting factors for agriculture. Soil salinity is a very dynamic property both spatially and temporally. Thus, mapping at field scale requires a rapid and reliable means of taking geospatial measurements. Electromagnetic Induction (EM) survey data and prediction equations relating the apparent electrical conductivity (ECa) measured by the EM-38 to soil salinity (ECe) are important tools to assess the spatial variability of soil salinity in a field. This research is being conducted at the SJRIP (San Joaquin River Improvement Project) facility managed by Panoche Water District (Los Banos, California) where subsurface drainage water is re-used on dedicated cropland (typically sown to forages such as alfalfa (*Medicago sativa*) and 'Jose' tall wheatgrass (*Thinopyrum ponticum* var. 'Jose' (TWG)) to reduce salt loading into the San Joaquin River. EM-38 soil salinity surveys are being conducted in two alfalfa and two tall wheatgrass fields to monitor soil salinity in response to the salinity (EC_w) and volume of applied drainage water. Data will be used for the refinement and validation of a computer model (CSUID-II) which will serve as a decision support tool to optimize soil leaching fractions for irrigation water applications of varying salinity levels, with the overall goal of improving the sustainability of the forage production under saline irrigation.

Presented at the ASA/CSSA/SSSA Annual Meeting, November 6-9, 2016, Phoenix, AZ.

Nitrogen and water use efficiencies in drip-irrigated sugarbeets

Touyee Thao**, Florence Cassel-Sharma, Dave Goorahoo, David Zoldoske, and **Anthony Mele******

Traditionally, sugarbeets in California have been cultivated with flood irrigation. However, because of diminishing high quality water supplies in the State, there is need to assess the effect of transitioning to low volume irrigation practices to optimize yield and quality of sugarbeets. Hence, the goal of this research was to evaluate Nitrogen and Water Use Efficiency (NUE

and WUE) for sugarbeets grown under different irrigation regimes and N fertilizer application rates. The experimental design was a split plot arrangement with 3 replicate of Irrigation as the main treatment (100% ET surface-drip, 70% ET surface-drip, and 100% ET furrow) and N rate as the secondary factor (0, 100, 150, and 200 lbs of N/ac). Sugarbeets were grown in Central California in sandy loam and clay loam soil. Preliminary results from the first season show that Irrigation had a significant effect ($P < 0.05$) on the total sucrose yield per acre in the sandy loam soil, with the 100% ET surface-drip treatment resulting in 43% greater yield. However, the irrigation regimes did not significantly affect the sucrose yield of the crop grown in the clay loam. For WUE, determined as sucrose yield as a function of the amount of total applied water, the 70% ET drip irrigated plots exceeded the 100% ET furrow irrigated plots by 25% and 39% for the sandy loam and clay loam, respectively. No sucrose yield responses to N application rates was observed in the sandy loam soil. However, there was a strong positive correlation (r2 = 0.81) between sucrose yield and N fertilizer rates in clay loam. In addition, the greatest NUE measured as tons of sucrose yield per lbs of N applied per acre, were observed for plots receiving 100 lbs of N/ acre, with values of 0.25 and 0.33 for sandy loam and clay loam, respectively.

Presented at the ASA/CSSA/SSSA Annual Meeting, November 6-9, 2016, Phoenix, AZ.

Anatomical damage in cotton squares by nymphal *Lygus lineolaris* in relation to EPG-recorded feeding behavior

Eeva Sharma**, *Felix Cervantes, Elaine Backus, and John Bushoven*

Lygus lineolaris is a key pest affecting cotton, *Gossypium spp.* The pest is widely distributed in the U.S., especially in eastern and mid-southern states. Nearly 53% of U.S. cotton acreage was infested by *Lygus* spp. in 2002. An individual lygus bug is capable of destroying up to 23,400 cotton squares per hectare. Fifth instar nymphs are the most aggressive feeders, hence, cause more economic loss. Nonetheless, little is known about how lygus feeding causes square damage. The objective of our research was to better understand damage to cotton squares from fifth instar nymphs, by performing a time course study of internal anatomical changes to squares after a standardized amount of feeding. Four hours of nymphal probing was applied via electropenetrography (EPG) to one cotton square on each of 32 plants. Each plant was held for either 0, 4, 12, or 24 hours (8 plants per treatment). Squares were then excised and prepared for light microscopy. Compared with healthy, undamaged control squares, *L. lineolaris* nymphal feeding caused grossly enlarged empty spaces, varying amounts of cellular degradation, and discoloration of tissues. Also, fifth instar nymphal feeding induced histological signs of tannin accumulation as a defensive response, at all time periods. Cellular degradation and tannin accumulation increased over the first 12 hours, whereas empty spaces in tissues were larger at 24 hours, suggesting a progression of damage symptoms. This study will be helpful in studying the role of tannins in cotton-lygus interactions, and in eventual development of new, resistant cotton varieties.

Presented at the International Congress of Entomology, September 25-30, 2016, Orlando, FL.

Distribution of nanoparticles in food and effects on behavioral responses and biology of *Solenopsis xyloni* (Hymenoptera: Formicidae) colonies.

Julie Pedraza*, *Y. Chen, H Liang, and J.M. González*

Solenopsis xyloni , commonly known as the Southern Fire Ant (SFA), is native to southern US and is an important urban and agricultural pest. SFA is an aggressive ant that causes crop damage, and possesses venom that causes human bite victims to suffer symptoms ranging from irritation to nausea. SFA builds colonies deep under the soil surface, and members of every colony, forage for hemipteran honeydew, sweet foods, seeds, seedlings, and other insects. This study was conducted to understand SFA feeding behavior and biology when exposed to presence of nanoparticles (NPs) in food sources. A first set of trials involved feeding SFA colonies with 10% honey-water (10HW) infused with nanoparticles. A second set of trials involved feeding SFA with mealworms [*Tenebrio molitor* (Coleoptera: Tenebrionidae)] previously fed with 10HW+NPs

and tested positive for NP's ingestion which were encapsulated inside the coelom. After tomographic observation no NPs were found inside SFA bodies from both trials.

Poster presented at the American Society of Agronomy (ASA) 2016 California Plant & Soil Conference, in Tulare, CA, Feb. 2-3, 2016 and at the 37th Annual Central California Research Symposium, April 20, 2016.

Tolerance of sorghum (*Sorghum bicolor* L. Moench) varieties to soil salinity at an early growth stage

Omar Robles, Larissa Larocca de Souza, Vitor Stella, Jeffery Dahlberg, Steve Wright, and Anil Shrestha.*

Sorghum is being explored in California as a water-use efficient crop. However, much of the areas suitable for sorghum in the Central Valley are high in soil salinity. Although sorghum is classified as medium-tolerant crop to soil salinity, its tolerance at early-growth stages need to be determined. An experiment was conducted in 2015 at Fresno, CA to determine the effect of early salt-stress on a selected forage (cv. SS405) and a grain (cv. NK5418) sorghum variety. Seeds were planted in 3 gal pots containing locally-collected field soil. The pots were kept outdoors. Once the seedlings emerged, they were thinned to one plant/pot and irrigated with 300 ml of either 0, 5, 10, 15, or 20 ds/m sodium chloride solutions on alternate days from 2 weeks after emergence (WAE) to 6 WAE. Plant growth parameters were measured every week and the plants were harvested at 7 WAE and their dry weights were recorded. The experiment was conducted twice using a randomized complete block design with four replications. Salt stress had similar effects on the aboveground biomass of both sorghum varieties. Salt concentration up to 5 dS/m did not reduce the aboveground biomass. However, biomass was reduced by 25% and 50% at approximately 7 and 18.5 dS/m, respectively. Stomatal conductance was reduced at salt concentrations greater than 15 ds/m. Therefore, sorghum seems to be moderately-sensitive to soil salinity at an early growth stage.

Poster presented at the American Society of Agronomy (ASA) 2016 California Plant & Soil Conference, in Tulare, CA, Feb. 2-3, 2016.

Effect of soil salinity and moisture stress on sorghum [*Sorghum bicolor* (L.) Moench] seed germination

***Yue Wu*, Ryan Cox**, *Larissa Larocca de Souza, Jeffery Dahlberg, Steve Wright, and Anil Shrestha.*

Sorghum is being explored as a water-use efficient crop in California. However, much of the areas suitable for sorghum in the Central Valley have high soil salinity and are prone to moisture stress. Sorghum is considered drought-tolerant and medium-tolerant to soil salinity; however, the effect of these stresses at seed germination needs to be determined. Two separate experiments were conducted at Fresno, CA to determine the effect of salt and moisture stress on seed germination of a forage (cv. SS405) and a grain (cv. NK5418) sorghum variety using solutions of salt (NaCl) concentrations ranging from 0 to 200mM and water potentials ranging from 0 to −5.56 MPa. Petri dishes containing the seeds in the different solutions were placed in growth chambers set at 30 ± 5°C, 12 hr daylength. Germination was monitored for two weeks. The experiments were replicated five times and repeated. The forage and grain varieties responded differently to the salt and moisture stresses. Grain sorghum germination was reduced by 20% even at the highest NaCl level, whereas forage sorghum germination was reduced by 50% at 180 mM. Moisture stress reduced the germination of the forage and grain sorghum varieties by 50% at approximately -2.5 MPa and -1.5 MPa, respectively. Therefore, grain sorghum was more tolerant to salt stress than moisture stress, whereas forage sorghum was more tolerant to moisture stress than salt stress. These studies suggest that the mechanism of tolerance to these stresses may be different in the two sorghum varieties. Although the varieties were considerably tolerant to salinity and moisture stress, variety recommendations may need to differ for different soil conditions.

Poster presented at the American Society of Agronomy (ASA) 2016 California Plant & Soil Conference, in Tulare, CA, Feb. 2-3, 2016.

Life cycle of fall- and spring-planted biotypes of Conyza sp. described in growing degree days

Katrina Steinhauer*, Marie Jasieniuk, Brad Hanson, and Anil Shrestha*

Horseweed (*Conyza canadensis*) and hairy fleabane (*C. bonariensis*) are two problematic weeds in California. Furthermore, glyphosate-resistant (GR) populations of these species have been documented. In the Central Valley, these species generally have two major times of emergence, late fall and late winter. However, the difference in growth and phenological development of the plants emerging at these two times of the year has not been studied. Also, it is not known if the development rate is different between the GR and glyphosate-susceptible (GS) biotypes. A two-year study was conducted to compare the growth and development of fall- and spring-planted GR and GS horseweed and hairy fleabane. Time taken to reach the rosette, bolting, initial appearance of flower bud, initial flowering, and initial seeding stages by the plants was recorded and converted to growing degree days (GDDs). Biomass of the plants at seed set was also recorded. Results showed that the fall-planted hairy fleabane required more GDDs to set seed than the spring-planted. However, there was no difference between the GR and the GS hairy fleabane types. In contrast, both the fall- and spring-planted horseweed required similar GDDs to reach the various stages but the GR horseweed plants required fewer GDDs to reach the various stages than the GS plants. Planting date had no effect on the aboveground hairy fleabane biomass but fall-planted horseweed amassed more dry matter than the spring-planted ones. It is reported that postemergence herbicides control these species better when applied at or before the rosette stage. Therefore, these species should be controlled by mid-November or early-April for the fall- and spring-emerging populations as they generally reach the rosette stage at these times.

Poster presented at the American Society of Agronomy (ASA) 2016 California Plant & Soil Conference, in Tulare, CA, Feb. 2-3, 2016.

Competition between a glyphosate-resistant and –susceptible biotype of junglerice (*Echinochloa colona*)

Pahoua Yang*, Larissa Larocca de Souza, and Anil Shrestha*

Junglerice (*Echinochloa colona*) is a problematic weed in annual and perennial cropping systems as well as non-crop areas of California. This problem has been further aggravated by the discovery of glyphosate-resistant (GR) biotypes in the Central Valley. Development of effective management strategies for herbicide-resistant weeds requires an understanding of population dynamics and potential impacts of the resistant biotype. For example, some herbicide-resistant biotypes carry a fitness penalty and can have reduced competitive ability than the herbicide-susceptible biotypes. Therefore, study of the competitive ability of resistant and susceptible biotypes of weeds is of ecological significance and can impact weed management decisions. Some studies have found that the GR horseweed (*Conyza canadensis*) was more competitive than the glyphosate-susceptible (GS) biotype. However, it is not known if it is the same case with junglerice. This needs to be determined as the findings may have ecological significance to the population dynamics of these two biotypes of junglerice in the Central Valley. Therefore, a study was conducted in summer 2015 in Fresno to compare the competitive ability of GR and GS junglerice.

Two- to 3-leaf seedlings of a confirmed GR and a GS junglerice biotype were obtained from University of California, Davis and were transplanted into 15.1 l (4 gal) plastic pots containing field soil. In each pot, the GR and GS plants were planted at different ratios in a replacement series experiment style. The ratios were 4:0, 3:1, 2:2, 1:3, and 0:4 of GR and GS plants, respectively. Each plant was labelled with a small plastic stake for identification. Each treatment was replicated four times and the experiment was arranged as a randomized complete block. All the pots were irrigated with 1.1 l/pot (0.3 gal/pot) of water every two days. Each pot was also fertilized with 100 ml (0.1 qt) of a solution containing 4 g (0.14 oz) of commercial fertilizer (Miracle-Gro) twice during the growing season. The plants were grown for six weeks. At the early flowering stage, the plants from each pot were individually harvested at the soil surface. Prior to harvest, plant height, number of tillers/plant, and number of leaves/plant were recorded. After harvest, the plants were individually stored in paper bags, oven dried at 60° C for 3 days and shoot dry weights was recorded. Data were analyzed using analysis of variance procedures in SAS at a 0.05 level of significance and graphs were prepared using SigmaPlot. The total average aboveground biomass and total dry weight of the inflorescence was greater in the GS than in the GR type. However, the number of flower heads was greater in the GR than in the GS type. This indicated that the biomass allocation

patterns to the reproductive structures and total seed production could be different in the GS and the GR junglerice. However, this cannot be ascertained as the experiment was terminated before seed set. The replacement series data showed that the GS junglerice was more competitive than the GR biotypes and produced more biomass at all densities. Therefore, this study indicated that the GS was more competitive than the GR junglerice biotypes tested. However, it cannot be generalized if this is the case with all GR and GS biotypes of junglerice in California.

Presented at the California Weed Science Society Annual Meeting, January 13-15, 2016, Sacramento, CA.

STUDENT PUBLICATIONS IN PEER-REVIEWED JOURNALS

Chen, Y., C. Sanchez, Y. Yue, **Mauricio De Almeida***, J. M. González, D. Y. Parkinson, and H. Liang. 2016. Observation of yttrium oxide nanoparticles in cabbage (*Brassica oleracea*) through dual energy K-edge subtraction imaging. *Journal of Nanobiotechnology*, 14:23.

Rios, S.**, S. D. Wright, **G. Banuelos****, and A. Shrestha. 2016. Tolerance of *Amaranthus palmeri* populations from California to postemergence herbicides at various growth stages. *Crop Protection* 87:6-12.

Shrestha, A., **R. Cox***, **Y. Wu***, **O. Robles***, L. deSouza, S. D. Wright, and J. Dahlberg. 2016. Moisture and salt tolerance of a forage and grain sorghum hybrid during germination and establishment. *Journal of Crop Improvement* 30:668-683.

Shrestha, A., K. Steinhauer**, B. Hanson, M. Jasieniuk, K. J. Hembree, and S. D. Wright. 2016. Growth and development of fall- and spring-planted populations of *Conyza canadensis* and *C. bonariensis*. *International Journal of Pest Management* 62:300-307.

RESEARCH IN ACTION

Plant Science graduate student Katrina Steinhauer (left) and undergraduate student Pahoua Yang (right) recording data on their experiment on junglerice

Graduate student Craig Seber had the unique opportunity in participating in the Peace Corps Masters in International Development program. Here he is see atop a Choerospondias axilaris tree in Nepal on which he conducted his thesis research.

Graduate student Jacob Hurst sub-cultures in vitro cactus shoots onto a rooting medium in the laminar flow hood

Plant Science graduate student Sangeeta Bansal (right) with her research on impact of salinity on biological nitrogen fixation in alfalfa and its response to applied mineral nitrogen. She is being assisted by Marcos H. F. Gomes (left), exchange student from University of Sao Paulo, Brazil.

JORDAN AGRICULTURAL RESEARCH CENTER

Photo courtesy of Univ. Communications

"The Jordan Agricultural Research Center is a revolutionary place that will better connect our college with the nation's leading agricultural area," said Sandra Witte, dean of the Jordan College. "Being able to work directly with other colleges and companies gives our students and faculty new ways to directly link to the professional world. It will provide vital experience to solving real-world issues while using the latest research methods and equipment. The generosity of the Jordan family will allow future generations of students to achieve their dreams and enhance quality of life for the region and beyond."

http://fresnostate.edu/jcast/research/index.html

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Jordan College of Agricultural Sciences and Technology

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