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August 2017



SOIL & CROP SCIENCES
TEXAS A&M UNIVERSITY

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AGRI LIFE
RESEARCH | EXTENSION

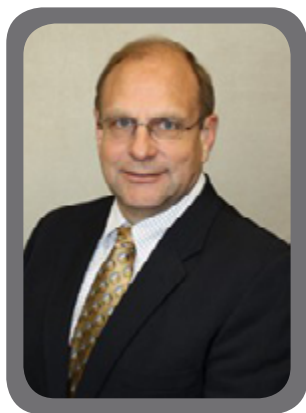


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Texas A&M University Department of Soil & Crop Sciences TAMU 2474, College Station, TX 77843 Ph. 979.845.3041

Comments from our Department Head



Dr. David Baltensperger

Department Head

Texas A&M University

Department of Soil and Crop Sciences

dbaltensperger@tamu.edu

As summer comes to an end, we get to witness the graduation of another crop of students. Many are now ready to enter the agricultural workforce and have accepted positions. Others are choosing to continue their education, searching for their precise niche. We congratulate them all and wish them the best of luck.

Summer is a busy time for our science, and a time for our faculty to display their accomplishments at field days. While many field days are now behind us, we are looking forward to the AMCOE Corn Breeding Field Day August 15-17 and the Rolling Plains Summer Field Day in Chillicothe, August 30.

The wheat workers just met in Amarillo, August 9-11, with the Small Grains Advisory Group meeting the afternoon of August 10. Many of the plant breeding students participated in the National Association of Plant Breeders meeting in Davis, CA, earlier in the week.

Dr. Hague took a group of students to Cuba as part of the study abroad program (story inside). This program is an excellent opportunity for our students to experience other cultures and the agricultural practices in use.

Two of our students are preparing to travel to the International Rice Research Institute in Los Banos,

Phillipines, for a three-week course called Rice: Research to Production. We are fortunate to have these opportunities to give our students hands-on experience.

Congratulations to Drs. Ambika Chandra, lead inventor; Dennis Genovesi, co-inventor; and Ben Wherley, contributor, for their recent patent on DALSA 0605 - the first interplod hybrid St. Augustinegrass to be commercialized. A big congratulations to all our faculty for a big push with grant writing this year. Several grants have recently been finalized and many are still in review.

It was great to participate in the annual Soils Critique in Amarillo. A big shout out to Dr. Jourdan Bell and her team for organizing and hosting. This provided a good opportunity to review what we do in soils across the state and to plan for future emphases in our soils work.

The wheels have already begun turning for the upcoming school year. Officers from the TAMU Agronomy Society have planted the cotton patch and corn field for this fall's Aggie Corn Maze. We hope things go well this year, with more moderate rains, and we look forward to another successful educational opportunity!

A Big Congratulations to Dr. Harry Cralle who will be retiring on August 31st. Dr. Richard White was also able to take advantage of the early retirement program at the end of July, but will be continuing in a contract position. Thanks to both for their many years of service to our teaching and research programs.

Dr. Travis Miller will also be retiring at the end of the month following a 39 year career with Texas A&M AgriLife Extension. While having served the last few years in administration, his roots remain in the department and he will be active in an Emeritus role in the department this fall.

Several staff members are also leaving the department. Li Zhang, our web designer, left at the end of June to move to Houston. Megan Teel will be leaving Aug. 12 for a position in the Horticulture Sciences Department. Dennis Pietsch is retiring August 31, after 44 years with the Crop Testing Program, but he will continue working on a part-time basis. We wish them all good luck!

Congratulations to the Weed Science Teams and their coaches, Drs. Muthu Bagavathiannan, Kathy Carson and Vijay Singh, for their successes at the Southern Weed Science Society contest. The students represented TAMU well! (see story inside)

A handwritten signature in black ink that reads "David".

Soil and Crop researchers recognized for grass patent



Pictured l to r: Brett Cornwell (Executive Director, Texas A&M Technology Commercialization), Dr. Chandra, Dr. Wherley, and Dr. Glen Laine (Vice President for Research). Dr. Dennis Genovesi (Research Scientist and co-inventor) was unable to attend the ceremony.

Dr. Ambika Chandra (Turfgrass breeder and Lead inventor) and Dr. Ben Wherley (Turfgrass ecologist and contributor) were recognized at the Technology Commercialization Patent Awards Banquet for the patent published for 'DALSA 0605' St. Augustinegrass.

DALSA 0605, marketed as TamStar, is a drought tolerant St. Augustinegrass licensed to the Turfgrass Producers of Texas. It is the first interplod hybrid turfgrass variety.

The patent process is fairly long, and includes many years of research. According to Chandra, the cross which resulted in DALSA 0605 was made back in 2004. After several years of research and testing, the varietal was released in 2014. The plant patent was awarded in 2016.

This is Chandra's first plant patent, but she has three more applications which will soon be filed. She is working to develop turfgrasses with improved stress tolerance - especially tolerance to drought and extreme temperatures.

Aggie Weed Science Team represents well in Florida

Weed Science students and their coaches traveled to Vero Beach, Florida recently to represent Texas A&M University at the Southern Weed Science Society weed contest.

Drs. Muthu Bagavathiannan, Katherine Carson, and Vijay Singh coached two graduate teams and an undergraduate team for the contest. Thirteen teams, representing nine universities competed.

"Last year was our first year to compete, and we didn't do so well," said graduate student Seth Abugho. "This was a redemption year for us!"

And redemption they received, as one graduate team placed third overall. Abugho, who is working on his Ph.D. in weed science, was the third high individual overall out of sixty-six contestants. Teammate Prabhu Govindasamy was the tenth place individual.

Spencer Samuelson and Blake Young rounded out the team, each making a substantial contribution to the team's success.

Other graduate students who competed were: Rui "Tabby" Liu, Kaisa Werner

and Josiane Argenta.

Three universities were represented in the undergraduate contest, where the Aggie team ended up on top.

Caitlin Lakey, a junior Agriculture Science major, was the high point individual overall. Hao Sheng-Lin, a senior Plant and Environmental Soil Science major, finishing as the third high individual.

Rounding out the undergraduate team were: Susie Lin, Taylor Thate, and Jennifer Dudak.

The contest is made up of five sections: weed identification, herbicide symptomology, sprayer calibration, written calibration and farmer problem solving.

In weed identification, the students must identify 100 plant species from seeds to cotyledon stage.

For herbicide symptomology, 25 different herbicides are used on six crop species and seven weed



The 2017 Soil and Crop Sciences Weed Science Teams with their coaches were (left to right): Front row: Muthu Bagavathiannan (Coach), Josiane Argenta (MS), Kathy Carson (Coach); Middle row: Seth Abugho (PhD), Prabhu Govindasamy (PhD), Caitlin Lakey (BS), Susie Lin (BS), Taylor Thate (BS), Kaisa Werner (MS), Jennifer Dudak (BS), Rui Liu (PhD), Vijay Singh (Coach); Back row: Hao Sheng-Lin (BS), Blake Young (MS), Spencer Samuelson (PhD)

species. Contestants must identify the herbicide used based on the symptomology exhibited by the plants.

The farmer problem is a simulated problem solving situation in which the students talk to the "farmer", and examine the field. Based on the plant symptomology and farm's management history, the team members must determine the problem and suggest a solution.

This year's team is sponsored by the Department of Soil and Crop Sciences, FMC, and Monsanto.

Ground-penetrating radar could help producers dig potatoes early

Story and photo by: Kay Ledbetter

Ground-penetrating radar might help the potato industry save water, according to Dr. Dirk Hays, Texas A&M AgriLife Research plant geneticist in the soil and crop sciences department at College Station.

Hays' latest project utilizes ground-penetrating radar to select early maturing potato cultivars, which can help producers make harvest decisions and increase water-use efficiency.



Dr. Dirk Hays, Texas A&M AgriLife Research plant geneticist in College Station, is using ground-penetrating radar to test for early maturing potato varieties.

His project is in coordination with AgriLife Research and the department of horticultural sciences potato breeding program conducted by breeders Dr. Creighton Miller and Dr. Isabel Vales, both at College Station.

"We know radar will work on potatoes," Hays said. "Radar works on detecting objects that are denser than the soil environment they are in. Potatoes are very moist versus the sandy soils they are grown in, so it's relatively easy to image the potatoes with the ground-penetrating radar."

He said under the current practices, the potato breeding program might start with 80,000 individual lines in early generation trials aimed at selecting high-yielding cultivars, and all lines are harvested at 120 days.

"If you want to select for earliness, say a cultivar that is mature at 90 days or 110 days, you would have to replicate the planting of that cultivar multiple times to allow for multiple harvests," Hays said. "The vegetative nature of the plants and the need to dig up the potatoes doesn't allow them to select for early maturity.

"But with ground penetrating radar, they can image the size of the tubers and get a correlation to the actual physical size of the potato without harvesting them. When we do that, we can get an almost one-to-one relationship between the digital image of the potato and the actual weight of the potato."

He said the early generations of those cultivars can be scanned and breeders can start selecting lines producing a high yield at an earlier rate without having massive trials and multiple harvest times.

"We might be able to help them select for new cultivars that are ready at 90 or 100 days and have a harvestable product," he said. "What we are doing is increasing the water-use efficiency, because in potato production you are watering for 120 days. If we can shorten the cycle of the crop, we can reduce the amount of water that needs to be applied."

Earliness in potatoes is also important for Texas producers in terms of being first to market versus northern states, Hays said. As such, the Texas potato crop commands a premium price. The premium price is short-lived, however, as potatoes begin to ripen and are harvested in more northern producing states.

"So another benefit to breeding for earliness in Texas-adapted potatoes would be to lengthen the harvest window that producers can sell at premium prices," he said.

Hays said his project has an additional objective – to optimize the equipment itself.

"These ground-coupled instruments have to contact the ground to select for earliness, and that's a little bit of a problem," he said. "It means you are basically running over the crop, damaging it during the development process."

Hays is working with a company called IDS GeoRadar North America to optimize the instrument so it is airborne and flies just above the canopy.

"That way we can get a three-dimensional image through a crop canopy and into the roots," Hays said. "We can go over the yield trials multiple times through the growing cycle without damaging the vegetation."

He said they hope to have this equipment tested as a prototype this fall with a commercial instrument available shortly after.

https://www.youtube.com/watch?v=oKb_hgpst3U&feature=youtu.be

Growing organic rice for market niche not simple

Story and photo by Kathleen Phillips

A market niche for organic rice has a potential to yield premium prices for farmers, but it's more involved than simply planting the seed and forgetting it until harvest time.

That was the message from a team of researchers at the Texas A&M AgriLife Research and Extension Center-Beaumont during a recent field day at which experimental plots were showcased for area growers.

Rice scientists are conducting a three-year, multi-state, \$1 million project exploring which rice varieties will yield best in an environment with no chemical treatments against diseases, weeds or insects. The idea is to be able to give farmers a "recipe" for growing rice organically, according to Dr. Shane Zhou, Texas A&M AgriLife Research plant pathologist in Beaumont and project leader.

"Currently, less than 2 percent of the total U.S. rice crop is organically produced," Zhou said. "And most of that is grown in California and Texas."

Six acres at the Beaumont facility are planted with rice varieties commonly grown in Texas. They've been subjected to a variety of treatments to determine how best to establish, grow and yield suitable harvests. Initially, the project started with 20 varieties in the tests. Half of those have since been cut from the project for not performing well enough.

This year, 10 varieties are showing varied quality of growth in experimental plots. Early indications show that cover crops of white clover, crimson clover and annual ryegrass performed best in Texas. Some of the varieties received a biocontrol seed treatment prior to planting to help control

disease potential. The team is also exploring how much seed is needed for planting to establish an optimal stand.

"The higher the seed rate, the lower the weed count in the field," said Dr. Fugen Dou, AgriLife Research integrated cropping systems nutrient management scientist, Beaumont. "Weeds are a major challenge because the grower can't use any herbicides. There are also problems with seed rot and seedling diseases, and the grower can not use any seed treatment fungicides."

For example, brown spot, a fungal disease, can occur on organic rice plants, due to a lack of nitrogen, which cannot be applied in its chemical form, Dou said.

"We have very limited options for providing enough nitrogen compared to conventional rice farming," Dou said. "The soil typically does not have enough nitrogen to support the rice reaching its yield potential."

That's why nitrogen-containing cover crops, also referred to as "green manure," like clover can be a boost, he said.

Winning the battle against weeds has focused on flooding the rice fields at certain times as the most important tool, according to Dr. Muthu Bagavathiannan, Texas A&M AgriLife Extension Service agronomist, College Station. He found that applying 3 inches of water to the test plots reduced germination of the most common species of weeds.

The worst insect pest for organic operations is the rice water weevil, according to Dr. Mo Way, AgriLife Extension entomologist, Beaumont.

"It lays its eggs underwater, then the eggs hatch and the larvae move down to the roots, where they feed," Way explained. "The larval stage can do a lot of damage. When water is applied much earlier on organic rice to control weeds, that means the rice is much smaller and it only takes a few larvae to do a lot of damage."

Way and his team have taken soil core samples from each of the variety plots, washed the roots over a fine mesh and counted the number of larvae present. This data will be analyzed to help determine control methods in organic production.

Bagavathiannan said finding the best practices for growing organic rice could pay off for farmers, because though the yields are usually much lower than conventionally grown rice, the price is often double.



Rice scientists are conducting a three-year, multi-state, \$1 million project exploring which rice varieties will yield best in an environment with no chemical treatments against diseases, weeds or insects. This field is at Beaumont, Texas.

<https://youtu.be/zIAORIOuLuA>

Forage pests active in improved pastures

Story and photo by Adam Russell

Forage producers should be on the watch for and ready to act against two pests known for decimating hay fields – fall armyworms and Bermudagrass stem maggots, said a Texas A&M AgriLife Extension Service expert.

Dr. Vanessa Corriher-Olson, AgriLife Extension forage specialist, Overton, said she has been receiving calls and reports regarding fall armyworm and Bermudagrass stem maggot activity in East Texas and Central Texas pastures.

Armyworm numbers typically rise in the fall, but weather conditions, such as a dry spell followed by a rain event and cooler temperatures, can lead to flushes of the pest, Corriher-Olson said.

“They like cooler, moist conditions, and the last few rain events created the right environment for them,” she said.

The armyworm got its name because they appear to march across hay fields, consuming the grass in their path.

Producers should scout each morning for armyworms, she said. Armyworms are green, brown or black in color and can be identified by the white inverted Y on their head. They can grow up to 1 inch in length when mature.

The threshold for insecticide

spray treating a pasture is three or more armyworms per square foot, Corriher-Olson said. Armyworms in those numbers should be treated immediately. Armyworms in the last two or three days of their larvae stage consume 85 percent of their diet.



Fall armyworms can inflict heavy damage on improved pastures very quickly. Texas A&M AgriLife Extension Service specialists recommend immediate treatment with a pyrethroid insecticide when the pests' numbers reach a threshold of three per square foot.

Corriher-Olson recommends insecticides labeled for armyworm control in pastures and hayfields. She said applicators should always follow all label instructions on pesticide use and restrictions.

“Armyworms are principally night feeders and can do a lot of damage very quickly,” she said. “So we recommend that producers act immediately once they’ve seen armyworms reach the threshold.”

More information about armyworms can be found in AgriLife Extension entomologist Dr. Allen Knutson’s report The Fall Armyworm – Pest of Pastures and Hay at: <http://foragefax.tamu.edu/files/2015/08/Armyworm-Fact-Sheet-2015.pdf>.

Corriher-Olson said she has also received several reports of Bermudagrass stem maggot, which hatch inside the grass stem and feed on the plant tissue, typically killing the top two leaves of the plant.

The stem maggot is difficult to scout, Corriher-Olson said. Maggots are typically not seen but become a small yellow fly, which is difficult to detect.

“Unfortunately, the way we typically detect stem maggots is by finding damage,” she said. “They typically kill the top two to three leaves, so if you look at your field and it looks like there’s been a frost event or you can pull the top two leaves from the stem very easily, you’ll want to take action.”

Corriher-Olson said producers should cut their hay meadow to reduce leaf, and therefore yield, losses once stem maggots are detected. Producers should follow by applying a pyrethroid insecticide seven days after the cutting to address the adult flies.

Do plants and soils really “talk”?



In a manner of speaking, yes, plants and soils do “talk”, according to Dr. Jake Mowrer, Soil and Crop Sciences Assistant Professor and Extension Specialist.

In his blog post on **Soils Matter**, Mowrer explains that plants “talk” by responding to their soil environment. The roots are very active in modifying the soil

to scavenge and extract more water and nutrients than the soil would give up on its own.

The roots also connect to form mycorrhizal networks which move food and water for the plants.

You may read the post at <https://soilsmatter.wordpress.com/2017/08/01/do-plants-and-soil-really-talk/>



Internship provides excellent learning opportunity

By: Beth Ann Luedeker

David Bryant, a senior Plant and Soil Science student, spent his summer as a soil scientist intern at the Lincoln, NE, Soil Survey Office. The internship included spending time working at the Kellogg Soil Survey Laboratory where he was introduced to each analytical section of the KSSL -- Sample Processing, Chemistry, Mineralogy, and Physics.



David Bryant at the Kellogg Soil Survey Laboratory. (USDA photo)

David had the opportunity to observe analytical processes in progress and interact with KSSL technicians. He learned how soil characterization samples submitted by Soil Survey Offices are processed and analyzed, which links back to soil sampling and descriptions in the field and to the interpretation of soil data received from the KSSL.

He also received hands-on experience crushing and processing soil samples collected by NRCS at a National Ecological Observatory Network (NEON) site in Wisconsin.

A native of College Station, David always had an interest in natural sciences.

"My first exposure to agriculture was when I started working at my friend, Joe Jeter's farm," David said. "I realized how little I knew about where my food comes. Looking into it, I discovered how impactful agriculture is in geopolitical, social and environmental realms, and I became eager to make a difference in the world through agriculture."

Soil and climate are huge factors in plant development, so I chose plant and environmental soil science as my field of focus."

The internship was an excellent opportunity for David to further his undergraduate education and to see some of the possibilities for agriculture in the future.

"I was really interested in the structure of the USDA's systems," David said. "They create incentives to practice sustainable farming and have a great reach in responsibility."

David has one more semester at TAMU. He will spend some of that time doing research in the Geography department working on data from the National Soil Moisture Network under Dr. Brent McRoberts.

He will receive his Bachelor of Science degree in December, and is currently considering volunteering in Latin America for a year in the area of agricultural development. After that, David will apply to graduate school and pursue a higher degree.

STARS get an introduction to Soil and Crop Sciences



Dr. Steve Hague discussed GMOs in agriculture with students from Houston and San Antonio area high schools. He used corn kernels to help the students connect what farmers earn and agriculture's impact on the economy.

Dr. Steve Hague represented Soil and Crop Sciences to about 30 high school students during the Summer Training in Agriculture and Related Sciences (STARS) camp hosted by the College of Agriculture and Life Sciences.

Hague conducted hands-on exercises in which students predicted corn yield and economic impact based on the number of kernels on an ear of corn. He also led them through an interactive game which addressed the importance of agriculture

in Texas, opportunities for them in COALS and the Department of Soil and Crop Sciences, and the impact of international agriculture development.

STARS is a two-day camp for students in Houston and San Antonio area high schools. The camp is designed to teach students about degree programs in COALS, networking, and agricultural career opportunities.





Rolling Plains Summer Field Day set for Aug. 30 in Chillicothe

By: Kay Ledbetter

The Rolling Plains Summer Field Day, hosted by the Texas A&M AgriLife Research and Extension Center in Vernon, will be Aug. 30.

The field day activities will focus on many of the cotton trials at the AgriLife Research Chillicothe Station, 1340 Farm-to-Market Road 392, south of Chillicothe.

“It is an important year for cotton production in Texas as new technologies came onto the market,” said Dr. Emi Kimura, Texas A&M AgriLife Extension Service agronomist in Vernon. “Producers will benefit from side-by-side variety demonstrations for their variety decision making next year.

“The field day is also a good opportunity for interaction between AgriLife personnel from both Vernon and College Station, agribusiness personnel and producers in the Rolling Plains,” Kimura said.

Registration is set for 7:45-8:30 a.m., followed by the field tour. There is no charge for the program and lunch will be provided.

Three Texas Department of Agriculture continuing education credits will be offered – two general and one integrated pest management.

Tour stops, topics and speakers will include:

– Cotton Trials: Replicated Agronomic Cotton Evaluation (RACE) Trials, and Management of Enlist and Extendflex Technologies, Kimura.

– Advancements in Cotton Development: Phenotyping, and Breeding for Yield Potential, Drought Tolerance and Insect Resistance, Dr. Steve Hague, associate professor of cotton genetics and breeding in the Texas A&M AgriLife Research Cotton Improvement Lab in College Station, and Dr. Curtis Adams, AgriLife Research cropping systems agronomist in Vernon.

– Conservation Systems: Conservation Tillage; Cover Crops; Irrigation Management; Soil Health and Producer Experiences, Dr. Paul DeLaune, AgriLife Research environmental soil scientist in Vernon, and area producers.

At 11 a.m., the event will move indoors for a presentation on herbicide regulations by Henry Krusekopf, Texas Department of Agriculture field inspector in Wichita Falls.

Also, Advances in Research and Technology will be discussed by AgriLife Research leaders Dr. Richard Vierling, Vernon center director; and Dr. Craig Nessler, director, and Dr. Bill McCutchen, executive associate director, both in College Station.

Following the noon lunch and updates from sponsors, there will be a wrap-up with drawings for door prizes.

For more information, call 940-552-9941 and extension 233 for Kimura, or extension 207 for DeLaune.

Private Well Water Management Training

1pm - 5 pm August 23, 2017

Lone Star Groundwater Conservation District Office,
655 Conroe Park North Drive, Conroe, Texas

This is a free training. If participants wish to bring in water samples they will be tested for \$10, due when sample is submitted. Sampling containers may be picked up from any AgriLife Extension office.

Seating is limited - please register in advance at <http://twon.tamu.edu/training> or by calling Drew Gholson at (979) 845-1461

For more information contact Gholson at the number above or dgholson@tamu.edu



Congratulations

To all our graduate students who are receiving an advanced degree this month!

Agronomy



Zhaoxin Chen

Zhaoxin received his Master of Science in Agronomy under the supervision of Dr. Ben Wherley and Dr. Russel Jessup.

He is originally from Chengdu, China, and came to A&M after earning his Bachelor of Science in Turfgrass Management from MSU in 2014.

Zhaoxin will continue to work under Dr. Ben Wherley at the turfgrass field lab.



Don Wesley Dyer

Wes received his Master of Science in Agronomy under the supervision of Dr. Ben Wherley.

A native of Humboldt, TN, he earned his Bachelor of Science in Agronomy from Mississippi State University in 2014.

Wes has accepted a position at Sports Field Solutions as an Assistant Turf Manager at Baylor University.



Russ Alan Garetson

Russ received his Master of Science in Agronomy under the supervision of Dr. Muthu Bagavathiannan.

He grew up in Talty, Texas and received his Bachelor of Science in Agronomy here at TAMU.

Russ began working as a Crop Specialist for AgVanta FS in May, based in Iowa.



William Brandon Smith

Brandon received his Ph.D. in Agronomy under the supervision of Dr. Monty Roquette and Dr. Luis Tedeschi.

He is a native of Slocomb, Alabama, and earned his Master of Science in Animal Science from the University of Arkansas.

Beginning September 1, Brandon will be an Assistant Professor of Ruminant Nutrition at Tarleton State University. He will split his time between teaching and developing a research program integrating forages and cattle.

Master of Science and Doctorate Degree Recipients *continued*

Plant Breeding



Morgan Nicole Carlson

Morgan received her Master of Science in Plant Breeding under the supervision of Dr. Russell Jessup.

A native of Dallas, Texas, Morgan had earned a Bachelor of Science in Bioenvironmental Science and a Bachelor of Science in Agronomy from TAMU in 2013.



Gregory Bryan Wilson

Greg received his Master of Science degree in Plant Breeding under the supervision of Dr. Russell Jessup.

As an undergraduate at TAMU, he double majored in Agronomy and Entomology, receiving a Bachelor of Science degree in each area.

Greg will be continuing his education here at A&M in the Department of Entomology. He will also work as a Ph.D. Graduate Assistant for the Office of the State IPM Coordinator.



Yifeng Xu

Yifeng received his Master of Science in Plant Breeding under the supervision of Dr. Russell Jessup.

Originally from Sichuan, China, Yifeng earned his Bachelor of Science from Michigan State University in 2014.

Yifeng is currently searching for a position.



Fatima Camarillo Castillo

Fatima earned her Ph.D. in Plant Breeding under the supervision of Dr. Dirk Hays.

A native of Pinos, Zacatecas, Mexico, she earned her Master of Science in Plant and Soil Sciences at the University of Massachusetts.

Fatima has accepted a Post-Doc position with CIMMYT. She will be joining the Biometrics and Statistical Unit in El Batan, Mexico, working on genomic prediction and selection in collaboration with the Colegio de Postgraduados.

Master of Science and Doctorate Degree Recipients *continued*

Soil Science



Jonathan William Gross

Jonathan received his Master of Science in Soil Science under the supervision of Dr. Cristine Morgan.

Originally from Dallas, Texas, Jonathan began his college career at Texas A&M, earning his Bachelor of Science in Agronomy in 2013.

Jonathan is now pursuing a Ph.D. in Geosciences at the University of Texas - Dallas.

Molecular & Environmental Plant Science



Salma Bibi

Salma earned her Master of Science in MEPS under the supervision of Dr. Dirk Hays.

Originally from the Kyber Pukhtunkhwa Province in northwestern Pakistan, Salma earned her Bachelor of Science in Biotechnology and Genetic Engineering from the Institute of Biotechnology and Genetic Engineering in Peshawar, Pakistan.

Salma now wants to serve her homeland. She has returned to Pakistan and is examining her possibilities there, as well as applying for Ph.D. positions abroad.



Chris Centeno

Chris received his Master of Science in MEPS under the supervision of Dr. David Stelly and Dr. Steve Hatch.

He earned his Bachelor of Science in Rangeland Ecology and Management at TAMU in 2013.

Chris is now pursuing a Ph.D. in MEPS with Dr. Russell Jessup.



Sabahat Zahra

Sabahat earned her Master of Science in MEPS under the supervision of Dr. Dirk Hays.

Originally from Pakistan, Sabahat earned her Bachelor of Science from the University of Agriculture in Faisalabad, Pakistan.

Master of Science and Doctorate Degree Recipients^{continued}

Molecular & Environmental Plant Science



Manuel Roman Chavarria Sanchez

Manuel earned his Ph.D. in MEPS studying Turfgrass Physiology and Management under the supervision of Dr. Ben Wherley, Dr. Russell Jessup, Dr. Ambika Chandra and Dr. Raul Cabrera.

He earned his Bachelor of Science in Natural Resources and Master of Science in Forest Science and Rangeland, both at the University of Chapingo in Texcoco, Mexico.

Manuel has accepted a Post-doc position in the Texas A&M Turfgrass program under Dr. Kevin McInnes and Dr. Ben Wherley.

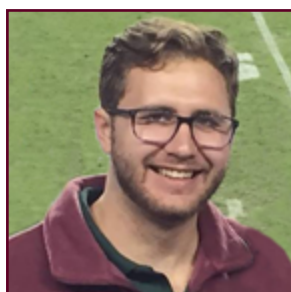


Xiangkun Gu

Xiangkun earned her Ph.D. in MEPS under the supervision of Dr. Dirk Hays.

Originally from Qingdao City, Shandong Province, China, Xiangkun earned her Bachelor of Science from the Chinese Academy of Agricultural Sciences in Beijing.

Xiangkun will be returning to China following graduation. She has accepted a Post-doc position at Huazhong Agriculture University in Wuhan City in the Hubei Province.



Collin Beckman

Students earning their

Bachelor of Science

in

Plant and Environmental Soil Science

August 11, 2017



Jeremy Garrett

Jeremy has returned home to manage the family farm.



Ryan Menefee

Ryan is now working for DuPont Pioneer in Taft, Texas, as a member of the IMPACT team.



Bianca Gutierrez Vela



Raul Ramirez

Raul has accepted a position at Rice Tech



Texas rice growers gear up for harvest - anticipate “normal” year

Story and photo by Kathleen Phillips

As Texas rice farmers gear up for harvest, no news from the field means potentially good news at the mill.

“We’re on the front end of the harvest, still about two weeks from the peak, and we’re not hearing of any serious problems with insects or horrendous disease problems,” said Dr. Ted Wilson, center director at Texas A&M AgriLife Research and Extension Center-Beaumont. “It’s too early to know what yields will be like, but we will probably have a normal year.”

Weeds have been the biggest issue this year, but were not too bad unless a field was in an area with a lot of rainfall, Wilson said.

The rice-growing region — more than 20 counties mostly



Rice fields in Texas are nearly ready for harvest.

along the upper Gulf Coast and near the Oklahoma-Arkansas border — has different soils and rainfall amounts each year, which impacts yields, he noted.

“East of Houston, the rice growing area gets an average of 60 inches of rain a year and the soils are heavier, so the moisture lingers,” Wilson said. “West of Houston, the rice fields get about 37 inches a year and the soil is lighter.”

Texas rice farmers planted 158,000 to 172,000 acres, Wilson estimated, and may be able to draw improving prices stemming from the overall U.S. and world rice situation.

<https://youtu.be/Ch8AIEZRCpS>

Overall, Wilson noted, the U.S. rice crop may have decreased about 500,000 acres from 2016 levels.

“Most of the drop this year is in Arkansas due to the heavy rains and flooding that happened too late for them to replant. Acreage in Texas may be down from 10-17 percent, which is largely due to suppressed prices,” Wilson said.

He explained that the huge carryover of rice internationally — especially in Thailand where the government had purchased large stocks from farmers and then dumped it on the global market — has been selling down to more manageable levels.

“As a result, prices are expected to soon rebound to the levels they should be,” he said. “Barring a tropical storm developing during harvest, we should have a normal year. We have phenomenal growers in Texas.”

Southern Cover Crops Council meets in College Station



Above: Nearly thirty members of the SCCC were present at this organizational meeting.

Right: Tamara Jones of Evident Impact LLC served as the facilitator for the two-day meeting.



An organizational meeting for the Southern Cover Crops Council was held at the Scotts Miracle-Gro Facility for Lawn and Garden Research in mid-July. Dr. Jake Mowrer and Dr. Katie Lewis represent Texas A&M University AgriLife on the council.

The SCCC is represented by all sectors of agriculture including researchers, extension personnel, farmers, government, and ag industry specialists.

The council has been created to expand the adoption of cover cropping through education and research, and by facilitating networking and collaboration between agriculture entities.

Study Abroad students travel to Cuba

By: Dr. Steve Hague

This summer seven students led by Dr. Steve Hague from the Department of Soil and Crop Sciences participated in a two-week program in Cuba organized by the Organization of Tropical Studies. The group learned about Cuba's approach to sustainable agriculture.

"This was my first international experience. I wasn't for sure what to expect. The people were so nice and it is a fascinating country," said Savannah Shelnutt, a sophomore Plant and Environmental Soil Science major.



Savannah Shelnutt measuring biodiversity in a corn field in central Cuba.

Students had the opportunity to explore intensive urban farms integrated with horticulture and livestock enterprises.



Left to right - Ryan Janda, Kyle Huvar, Clay Glaze, Matt Joost, and Barret Page touring the turf grass plots at the Indio Hatuey Research Station in Cuba.

These 'organoponicos' are critical suppliers of fresh fruits, vegetables, and meat for city-dwellers.

Rural farms that the group visited relied heavily upon locally sourced inputs. A common thread among all private agriculture production was low-energy input technology. The U.S. embargo has largely restricted Cubans from access to many agriculture inputs. In response, many small stakeholders make extensive use of biopesticides, organic forms of soil amendments, and crop diversity in the operations. A holistic system is essential to successful farming in Cuba.

"I enjoyed contrasting how the Cubans farm and their

production constraints versus the way my family and I farm," reported Kyle Huvar, whose family farms rice, row crops, and sod near Garwood, Texas.

As part of the program, students had independent research projects involving biodiversity in cropping systems, gender equity issues, and use of repellent and trap crops.

The group had a day in which to see the sights, sounds and history of Old Havana, a UNESCO heritage city. They also spent a day at the beach resort town of Varadero where they visited Cuba's only golf course and toured the organic-based landscaping at one of the country's premier resorts for international tourists.



Student participants Kyle Huvar, Clay Glaze, Barret Page, Savannah Shelnutt, Matt Joost, Haley Kennedy, and Ryan Janda with their hosts at the Sustainable Agriculture program in Cuba.

2017 Soils Critique



The 2017 Soils Critique was held at the Texas A&M AgriLife Research and Extension Center at Amarillo on July 24-25. Over 30 soil scientists, agronomists and students from AgriLife Research and Extension, West Texas A&M University, NRCS, and USDA-ARS were in attendance. There was a morning tour at the joint AgriLife and USDA-ARS Conservation Production Research Laboratory

at Bushland. The tour centered on research to improve crop water use efficiencies in both irrigated and dryland production systems. The Texas A&M Soils Critique is held annually across the state to discuss current Soil Science research, extension and teaching programs as well as future needs to meet long-term soil sustainability while improving crop production.

Students to attend rice conference in the Philippines

By: Beth Ann Luedeker

Rui (Tabby) Liu and Karina Morales, two soil and crop science graduate students, will be travelling to the Philippines in mid-August to attend the Rice: Research to Production course at the International Rice Research Institute (IRRI).

Tabby is working on her Ph.D. in Agronomy, focused on weed science under the supervision of Dr. Muthu Bagavathiannan. Her research project investigates herbicide resistance of rice weeds.



Rui "Tabby" Liu

Tabby earned her Master of Science in Developmental Biology at Nanjing Agriculture University where she focused on red rice, a weed species which is severely detrimental to rice production in China.

"At this conference, I am hoping

to gain a deeper understanding of rice production, the challenges and opportunities rice research is facing, and the role it plays regarding rice food security and improving the livelihood of poor rice producers," Tabby said.

Once she completes her Ph.D., Tabby will be seeking a job in which she can apply both her lab and field experience to help rice farmers.

She is looking forward to seeing some of the international collaborations at IRRI, and to make some network connections there.

Karina is working on her Master of Science in Plant Breeding under the supervision of Dr. Michael Thompson. Her research focus is on genetics and gene editing of the rice genes related to flowering time.

Karina grew up in Bishop, CA, and completed her undergraduate work at Azusa Pacific University.

While at Azusa she participated in plant physiology research and had the opportunity to spend a summer in Japan through a fellowship from the American Society of Plant Biologists.

"That project focused on the physiological response of rice grown under elevated carbon dioxide," Karina stated. "During that summer I fell in



Karina Morales

love with rice research and decided to pursue my master's."

"At this course, I will be exposed to many of the projects at IRRI and a Philippine rice production company including rice breeding, genomics work and gene editing," Karina said. "It will also allow me to make connections with other rice researchers from around the world."

According to the IRRI website, the course will cover a mix of classroom lectures, group discussions and hands-on field sessions. It will cover the basics of rice production, the changes and challenges in the rice industry from production to market, knowledge of the research issues, advancements in rice breeding; and how to structure an effective collaboration within the international research community.

Sympathy and Concerns

Please keep these people in your thoughts and prayers

Barbara Childress and her family as they mourn the loss of her father, David Brush, who passed away August 7. Barbara is responsible for the department's HR.

Steve Labar & his family as they mourn the loss of his father-in-law, Ervin "Ernie" Willmann, who passed away July 14. Steve is a Research Assistant in the department.

Dr. Dudley Smith has been moved to the Hudson Creek Alzheimer's Special Care Center in College Station. He is suffering from Lewy Body dementia. Visitors are not encouraged at this time. Please contact Angela before planning a visit.

Dr. Joe Dixon remains at Crestview. Gladys Wilding has been released to continue her recovery at home.

Soil water storage,

new varieties critical to wheat production

Story and Photo By:
Kay Ledbetter

Regardless of what watering regimen a producer might have on wheat, in the High Plains it is critical that new varieties are grown to maximize yields, according to a long-running study by Texas A&M AgriLife Research.

“The overall objective of our program is to better understand the physiological responses of different wheat genotypes to drought stress and water-limited conditions,” said Dr. Qingwu Xue, AgriLife Research crop stress physiologist in Amarillo. “We have an overall goal to improve the water-use efficiency and yields of wheat.”

Utilizing a center-pivot irrigation system, he has been growing the top 20 varieties for the High Plains under different water treatments ranging from dryland to limited and full irrigation since 2011. The physiology group works with Dr. Jackie Rudd, wheat breeder, and Dr. Shuyu Liu, small grain geneticist, both with AgriLife Research in Amarillo.

“We want to identify the best management practices and genotypes

in these environments to recommend to producers that will help them optimize their water use,” Xue said.

“So far, what we have found is effective water use is still very important, especially under limited-water conditions. Dr. Sushil Thapa, the post-doctoral scientist working in our group, has summarized field data for the last five wheat growing seasons at Bushland.

“We are looking at the soil-water dynamics in different varieties developed from the 1970s to the most recent and how the soil-water extraction is correlated to yield and yield components,” Xue said. “What we found is the newer varieties have better capability to utilize soil water.”

They found the wheat was using water only from the 3-4 foot soil profile in the dry season of 2011. In contrast, the wheat plots harvested in 2016 were able to use the water from 6-8 feet.

Over the last 30 or 40 years, breeding has improved wheat’s capability to access soil water stored during the fallow period and the water from seasonal rainfall.

“We specifically looked at TAM 105 compared to TAM 111 and TAM 112,” Xue said. “Comparing those three varieties, the two newer varieties always had a better ability to extract water from the deeper soil.”

The best way to improve soil-water storage is allowing for sufficient fallow periods with good residue management, Xue said.

With good soil moisture,

the newer varieties will produce more forage and establish a better root system in the early stages of growth, Thapa said.

“While many producers may think about forage only for cattle grazing, it is also important for yield potential as it is a good indicator that a strong root system is being developed,” Xue said.

“In a wet year like 2016, the variety difference was even more significant,” he said. “With the older varieties, you’re looking at around 40 bushels per acre. But the newer varieties like TAM 114 yielded 60 bushels per acre. So if you can get 10 to 20 bushels per acre difference over a large area that’s a big difference.”

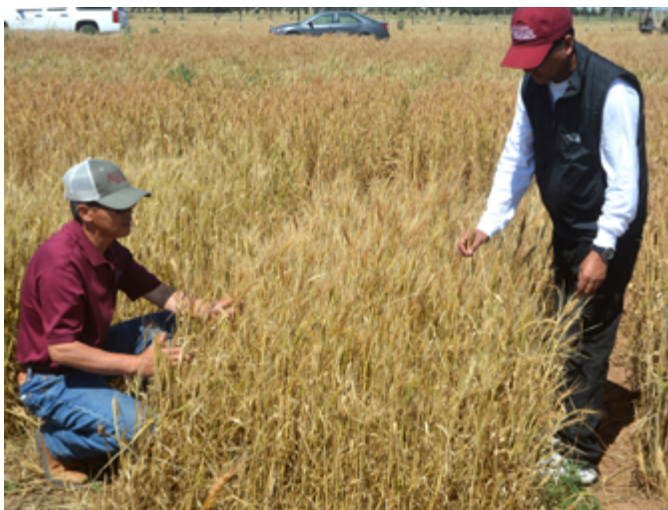
Xue said using the newer varieties with the ability to produce more forage early and thus deeper roots will help, but the field must have good soil water to start with, even on dryland, or it might be well to let the field lay fallow for a longer time.

“In this environment, if you don’t have good ground cover and good forage in the early stages of wheat, you probably don’t have a good chance to obtain the higher grain yield, given a highly variable seasonal rainfall,” he said.

For years with exceptional water, he suggested producers consider putting nitrogen on their wheat field to help early growth and the ability to utilize deep soil moisture.

Also, producers who know their wheat will have adequate water need to consider the newer varieties with disease-resistance traits, he said.

“That was especially significant this year when we saw a lot of wheat streak mosaic virus damage on some varieties and much less on others,” Xue said.



Dr. Qingwu Xue, AgriLife Research crop stress physiologist in Amarillo, and Dr. Sushil Thapa, a post-doctoral scientist, check out a plot of wheat in the study.

TAMU Soil and Crop Sciences represented at international conference

Dr. Youjun Deng and Dr. Ana Barrientos, soil researchers in the Department of Soil and Crop Sciences, presented two ongoing research projects at the 16th International Clay Conference (ICC) in Granada, Spain, in July.

The duo presented their current aflatoxin research in which they modify clay minerals with organic nutrients, rather than traditional toxic surfactants, to enhance detoxification efficiency of the clays in biological fluid systems.



Field trip group at the Monsul beach, Cabo de Gata. Hyaloclastic breccias (hydrated volcanic breccias) on the back. The rock formed when the volcano erupted under the sea water about 10-12 million years ago. (Photo provided by Dr. Youjun Deng)

They also presented research studying the natural manganese oxides formed in bentonite deposits. The goal of this study is to determine how often the oxides form, the types of minerals

present and how heavy metals are incorporated.

According to Barrientos, the scarcity of manganese in soils and sediments has hindered the understanding of how manganese oxides in micronutrients and heavy metals impact the environment.

The ICC is organized by the International Association of Study of Clays (AIPEA) and the Spanish Clay Society (SEA).

More than 700 clay scientists from 55 countries participated at this quadrennial meeting. During the five day conference, there were 38 technical sessions which included more than 830 presentations covering the diverse areas in clay science.

“The steady number of participants from geology, soil science, and chemistry, and increasing involvements of scientists and engineers from materials science, medicine, planetary science, suggested the expansion and evolution of the clay science in this new era,” Deng said.

“The conference offered the participants an excellent opportunity to examine the new theories, methods, and topics as well as a platform to network and collaborate with clay

scientists around the world.”

During the conference, Barrientos and Deng accompanied other clay researchers on a field trip focused on the bentonite clay genesis and properties in the volcanic area of Cabo de Gata, Almeria province, Spain. The region encompasses many bentonite deposits formed from hydrothermal alteration of the volcanic rocks.



White ignimbrite, left, formed from volcanic ash flowing down volcano slope during an immense explosion. The greenish-grey bentonite clay (right) formed from ignimbrite due to hydrothermal fluids in faults. (Photo by Dr. Youjun Deng)

Barrientos explained that the group examined the volcanic rocks and two commercial bentonite mines.

“Participants had intense, and sometimes wild debate and discussion about the formation, properties, modification, and applications of the clays,” she said.

3rd Annual AMCOE Corn Breeding

Field Day

August 15 - 17, 2017

AgriLife Research and Extension Center - Lubbock

For more information contact: Dr. Wenwei Xu - wxu@ag.tamu.edu 806-723-8436

TEXAS A&M
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Lubbock AgriLife Research soil scientist seeks optimum soil fertility solutions

Story by: Steve Burns

When it comes to applying fertilizer, Dr. Katie Lewis, a Texas A&M AgriLife Research soil scientist at Lubbock, is seeking to optimize its positive aspects while easing the sometimes negative effects on farmers' wallets and the environment.

"As a soil fertility program, we are constantly evaluating new fertilizer formulations in terms of efficiency and cost effectiveness, but there is also a strong environmental aspect to our research," Lewis said. "It is really quite amazing to me the amount of new technology that's becoming available. I think in coming years we are going to see much improvement in fertilizer-use efficiency, not just based on the source we are using, but also through associated management tools."

With cover crops becoming more of a common practice, Lewis said it's important to learn how to appropriately fertilize in those systems, so she is currently involved in looking at nitrogen management within a no till system.

"Being a farmer's wife, I know all too well that budgets are tight when it comes to

crop production; fertilizer can be a major input cost," she said. "If we can better manage the fertilizer we are applying, we may be able to cut our input costs, and also limit nutrient runoff situations or leaching of nitrogen through our soil profile, which can lead to serious environmental issues.

"High levels of nitrates in groundwater and algal blooms in surface water are negative effects of over fertilization and poor management," Lewis said. "One of the goals of our program is to reduce the amount of fertilizer we're applying by increasing the efficiency of that fertilizer. Increased efficiency may come from using new formulations and/or adding stabilizer products to the fertilizer, but most importantly, it will come from proper management practices.

"Proper management may mean just managing what we are currently doing a bit better. Rather than putting all of your nitrogen out in one application, we are looking at multiple smaller applications over several months in cotton following wheat cover compared to nitrogen fertilizer with an added stabilizer product, which may allow the crop to better use

the product, resulting in less potential loss from the system."

So the take home message Lewis has for farmers wanting the most bang for their buck is the same one Texas A&M AgriLife Extension Service county agents have touted for years...take a soil sample and get it tested.

"Go out, sample your fields, know what residual nutrients you have in your soil," Lewis said. "That's a key way to reduce the amount of fertilizer you apply. Producers may be surprised at how much nitrogen and phosphorous they may already have in their soil. That simple soil test can cut costs. I think probably the most important thing I can do is encourage growers to get soil samples analyzed before they buy or apply fertilizer. So remember, the old saying that's still true today, 'a penny saved is a penny earned.'"



Dr. Katie Lewis.



Lorin Harvey harvesting and collecting data on the parent inbreds. The hybrids were to be harvested the following week.

Biofuel Sorghum Research



Lorin Harvey, a Ph.D. student under Dr. Bill Rooney, is busy harvesting and collecting data on his sorghum research plots. His research is set up to determine whether or not selections based on inbred parents is sufficient to predict hybrid performance.

According to Harvey, many people only grow and measure inbreds, and then use that data to select for potential hybrids.

"Since sorghum is typically grown as a hybrid crop it is

possible that using only inbreds is not sufficient," Harvey said.

He and Dr. Hague are growing both the inbred parents and the hybrids side to side. They are collecting various phenotypic measurements as well as extracting DNA.

"With this information we will evaluate the correlations between the inbreds and the hybrids, and develop a QTL map to test our predicted hypothesis," Harvey said.

Guar topic of Aug. 15 workshop, field tour in Lubbock

By: Steve Byrns

Guar, a multi-use, drought-resistant crop in the bean family, will take center stage during an Aug. 15 workshop and field tour in Lubbock, a Texas A&M AgriLife Extension Service agronomist at Lubbock said.

Dr. Calvin Trostle said he and his colleague, Dr. Mark Burow, Texas A&M AgriLife Research peanut breeder at Lubbock, have received a U.S. Department of Agriculture National Institute of Food and Agriculture planning grant for guar work.



Guar, shown here, will be the subject of an Aug. 15 event in Lubbock. (Texas A&M AgriLife Extension Service photo)

“The proposal that was funded and is making current activities possible is entitled ‘Guar Improvement and Utilization in the U.S. Southwest: A Research and Extension Planning Proposal,’” he said. “It enables us to bring together interested parties to plan for a full proposal to be submitted likely sometime this fall. With that in mind we’re inviting anyone interested in Texas and U.S. Southwest guar production to

a full day of events.”

Trostle said the 8 a.m.-6 p.m. program, which is free and open to the public, will begin with research reports from various investigators through 2 p.m. at the U.S. Department of Agriculture Plant Stress Lab at 3810 4th Street. Lunch will be provided. At about 2 p.m., tour vans will depart to a growing field and then to Guar Resources for a look at their new guar processing plant followed by dinner.

“As guar is about as heat- and drought-tolerant a crop as you can grow in Texas, it is drawing significant interest,” Trostle said. “To the extent that climate change may affect cropping in the U.S. Southwest, guar is the kind of crop that could help maintain viable cropping into the future. I joke that if guar were a person with a choice between an 85-degree day and a 105-degree day, it would opt for the latter; it’s that tough.”

Trostle said historically, commercial guar production started in Texas in the 1950s. The most common use for the gum found in the seeds is in oilfield fracking services, but there are many other uses including in foods as an emulsifier and thickener, in cosmetics, personal care products and industrial applications.

“Most guar is grown in India and Pakistan and to some extent they exert control over the world market,” Trostle said. “We found one reference from USDA in 2011,

that the value of guar gum and guar byproducts imported through the Port of Houston that year was \$1.1 billion at historical prices. We would like to keep some of that money home.”

Trostle said research and extension staffs from Oklahoma, Texas, New Mexico, and Arizona are participating in the meeting. Following the meeting, the group will draft an outline for the next round of potential USDA funding he said could bolster regional research in plant breeding, weed and disease control and agronomy, as well as legume Rhizobium inoculation to provide nitrogen to the plants.

For more crop information on guar, see <http://lubbock.tamu.edu/guar>.

Trostle has also hosted farmer “listening meetings” in Arizona, Texas and Oklahoma to gather feedback from growers on their need for research to improve the economic competitiveness of the crop.

“As a legume, guar is an excellent rotation crop because it is a nitrogen fixer, nitrogen being something most other crops deplete, so it would complement Texas cotton rotations,” Trostle said. “Farmers often tell me they can tell to the exact row where they grew guar the year before in their subsequent cotton crop due to the vigor of the plants.”

For further information, contact Trostle at 806-746-6101, or ctrostle@ag.tamu.edu.

Calendar

August

- 8 - Turf Producers of Texas Golf Tournament - Bay City, Texas
- 9-11 - Small Grain Workers Meeting Contact: [Clark Neely](#)
- 10 - Small Grain Advisory Council
- 11 - Graduation - 9:00 a.m. Reed Arena
- 15 - Rainwater Harvesting Program - Seguin
- 15-17 - AMCOE Corn Breeding Field Day - Lubbock
- 23 - Texas Well Owner Network training - Conroe Contact: [Drew Gholson](#) or [TWON](#)
- 28 - AgriLife reception for Dr. Travis Miller
- 28 - First day of fall semester
- 29 - Promotion and Tenure Faculty Meeting
- 30 - Rolling Plains Summer Crop Field Day - Chillicothe

September

- 5 - Reception for Dr. Travis Miller - Scotts Miracle-gro Facility
- 5 - 7 - Extension Retreat - Scott's Building, College Station
- 8 - Retirement lunch for Dennis Pietsch - Scotts Miracle-gro Facility
- 11 - FAC Meeting
- 11-15 or 18-20 - Potential visit by Dr. Dan Voytas
- 15 - Wildlife, Fisheries and Ecological Sciences Building Grand Opening
- 20 - Dean's Outstanding Achievement Awards - AgriLife Center, College Station
- 26 - Texas Well Owner Network Training - New Braunfels Contact: [Drew Gholson](#) or [TWON](#)

October

- 2-3 - Bennett Trust Women's Conference, Fredericksburg Contact: [Larry Redmon](#)
- 5-6 - Surface Mine Reclamation Workshop, College Station Contact: [Sam Feagley](#)
- 9 - FAC Meeting
- 9-13 - Ranch Management University - College Station Contact: [Larry Redmon](#)
- 11 - Turfgrass Field Day - College Station Contact: [Ben Wherley](#)
- 18-20 - 2017 Borlaug Dialog International Symposium - World Food Prize
- 22-23 - Turf Producers of Texas Fishing Tournament -
- 22-25 - Annual Meeting ASA, CSSA, SSSA - Tampa, FL
- 25-27 - CAST Board Meeting - Raleigh, NC
- 28 - College of Agriculture and Life Sciences Tailgate, AGLS Complex

Save the Date

- November 10 - Legacy and Leadership Banquet, Brazos County Expo Complex
- December 5-6 - Texas Plant Protection Conference - Bryan-College Station
- December 5-7 - Texas Turfgrass Annual Conference and Show - Arlington