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TEXAS A&M UNIVERSITY

New Waves

Texas Water Resources Institute's E-Newsletter
Breaking news about water resources research and education at Texas universities

December 4, 2009

Save the date for water funding workshop

Texas Water Resources Institute will be sponsoring a meeting titled "Funding Your Water Program: One-on-One with Water Agencies" on **Jan. 11, 2010**, as part of the annual Texas A&M AgriLife conference. The interactive session will be from 1-4:30 p.m. in Rudder Tower, room 301.

This workshop is for research and Extension faculty from Texas AgriLife as well as other universities with interest and expertise in developing collaborative water research and Extension programs. Key state and federal water agency personnel will discuss the agency roles, research and education needs, collaboration opportunities, and available funding programs.

For more information and to RSVP, visit https://twri.tamu.edu/one-on-one.php.

2010-11 TWRI graduate student grant RFP

The Texas Water Resources Institute announces a request for research proposals for its 2010-2011 TWRI Grant Program. This program is made possible by support provided through the U.S. Geological Survey and the National Institutes for Water Research and it is aimed at supporting water resources-related research by graduate students at universities in Texas.

TWRI anticipates funding 10 graduate research enhancement grants of up to $5,000 in the area of water resources. Information and submission forms are available at http://twri.tamu.edu/usgs.php.

The deadline for submission is **Dec. 17, 2009**.

TCEQ establishes Office of Water

The Texas Commission on Environmental Quality (TCEQ) has established a new Office of Water, effective Dec. 1 with **L'Oreal Stepney** serving as deputy director. The new office will encompass the three existing major water divisions in the agency: Water Planning, Water Supply, and Water Quality.

TECQ Chairman **Dr. Bryan W. Shaw** said the new office recognizes that the state's population is expected to double in the next 30 years. "So the agency must put even more focus on water issues to ensure that there will be adequate water quality and quantity for future demand," he said.

"There are 6,800 public water systems in our state," said Executive Director **Mark Vickery**. "Making sure that the water that comes through these systems is clean and healthy is a priority of the TCEQ and is critically important to many, many Texans."

During her time with TCEQ, Stepney has served in air permitting and wastewater permitting, as section manager of the Wastewater Permitting Section, as Water Quality Division director, and her most recent assignment was assistant deputy director for the Office of Permitting and Registration.

Acknowledging that Texas has experienced a fierce drought over the past several years, Commissioner and former Rio Grande Watermaster **Carlos Rubinstein** said: "Our agency's response to the people and communities that suffered from this event was extraordinary, and this new Office of Water will ensure that we provide an even higher and more focused level of response."

"Water planning, water supply, and water quality are all issues that are important to the future of our state," said Commissioner **Buddy Garcia**. "This is an important step in our reorganization."

To read the TCEQ news release, see here.

Pecos River Basin Assessment Program moves into implementation phase

A series of public meetings for landowners around the Pecos River in West Texas were recently held to familiarize them with the watershed's new watershed protection plan and help eligible landowners learn where to apply for the cost-share funding the program provides.

"A Watershed Protection Plan for the Pecos River in Texas" addresses issues in the watershed and recommends voluntary management strategies. The plan is the culmination of the Pecos River Basin Assessment Program, which began in September 2004.

"The objective of the program is to create a long-term, landowner-driven management plan that will restore water quality within the river," said **Gary Bryant**, Texas AgriLife Extension Service program specialist and the project's coordinator headquartered at Fort Stockton.

Funding for the program and plan was provided by the Texas State Soil and Water Conservation Board through the U.S. Environmental Protection Agency with Clean Water Act Section 319(h) nonpoint source grant funds. Collaborators are Texas Water Resources Institute, Texas AgriLife Research, Texas AgriLife Extension Service, Texas Forest Service, USDA - Natural Resource Conservation Service, International Boundary and Water Commission, Upper Pecos Soil and Water Conservation District, Crockett Soil and Water Conservation District and other soil and water conservation districts in the Pecos Basin.

To read the full AgriLife News story, visit here.

Seawright's research proves economic value of fighting invasive plant

As a part of the Rio Grande Basin Initiative, agricultural economics researchers at Texas A&M AgriLife have worked to identify economically-viable solutions to water quality and quantity challenges in the Rio Grande Valley, and agricultural economics graduate student **Emily Seawright** has played an important role in this timely research.

Seawright's work focused on developing and using an economic model to examine potential implications of the U.S. Department of Agriculture – Agricultural Research Service (USDA-ARS) biological control program for *Arundo donax*, commonly known as giant reed.

"This control program is anticipated to reduce the amount of giant reed present in the Texas Rio Grande Basin, thus increasing available water supply to the Texas Lower Rio Grande Valley," Seawright said. "The purpose of this research is to estimate the potential economic benefits for the Texas Lower Rio Grande Valley gained from water saved by reducing giant reed, and to perform a benefit-cost analysis, a per-unit cost analysis, and an economic impact analysis of the program to the region."

The project was supported for the 2008-09 academic year by funding from the USDA-ARS, the Rio Grande Basin Initiative, and a $5,000 Texas Water Resources Institute (TWRI) grant provided by the U.S. Geological Survey (USGS) as part of the National Institutes for Water Research annual research program. TWRI is the federally designated institute for water resources research in Texas.

The use of biological controls (i.e., beneficial insects) on *Arundo donax*, a perennial, non-native invasive weed, was deemed necessary by scientists because the huge weeds consume large quantities of water along the banks of the Rio Grande.

"*Arundo* is estimated to consume 4.37 ac-ft/acre/year, in addition to decreasing riparian diversity, altering the water stream, and choking irrigation canals," Seawright said.

The ArundoEcon© model was developed by Seawright and AgriLife researchers and incorporates life-cycle cost analysis. Seawright used the model and USDA-ARS estimates of the biological control program's potential effects to determine that the biological control program, still in the planning stages at the time, is economically justified. Working with **Dr. John Goolsby** of USDA-ARS at Weslaco, **Allen Sturdivant** of Texas AgriLife Extension Service at Weslaco, **Drs. Ed Rister** and **Ron Lacewell** of Texas AgriLife Research in College Station, and **Dr. Dean McCorkle** of Texas AgriLife Extension Service in College Station, Seawright identified the life-cycle cost of saving water to be $44/ac-ft/year, along with a benefit cost ratio between $4.38:1 and $8.81:1, meaning social benefits would be between $4.38 and $8.81 for every $1 spent on the biological control project.

Seawright, who graduated with her master's in agricultural economics in August, said that she hopes her research will help show Texans the economic importance of multi-disciplinary scientific programs such as the biological control program for *Arundo donax*.

"I chose this area of research because it offered me the opportunity to apply what I learned in classes and to also collaborate with several scientific disciplines, such as entomology and ecosystem science,"

Seawright said. "The diversity of the study expanded my knowledge in different scientific fields and really showed me how my work is integrated with the work of field scientists."

For more information on Seawright's research, see the final technical report here or visit TWRI's USGS Research Grants Web page.

Svetlik joins TWRI staff

Julie Svetlik has recently joined the Texas Water Resources Institute (TWRI) as a project specialist. Svetlik joins TWRI via a joint appointment also including the Institute of Renewable Natural Resources and Texas AgriLife Research Office of Corporate Relations.

Before joining the institute, she served as natural resource economist for the West Virginia Water Research Institute. Svetlik holds a bachelor's in wildlife and fisheries sciences from Texas A&M University and a master's in agriculture and resource economics from West Virginia University. She is currently a doctorate candidate in resource management and sustainable development, also from West Virginia University.

TWRI grant recipient characterizes gene that increases plants' drought tolerance

Kranthi Kiran Mandadi, a doctoral student in the molecular and environmental plant sciences program at Texas A&M University, recently researched the mechanics of an influential plant gene in order to improve the productivity and drought-tolerance of Texas crops.

Texas Water Resources Institute (TWRI) supported Mandadi's project for the 2008-2009 academic year with a $5,000 grant provided by the U.S. Geological Survey (USGS) as part of the National Institutes for Water Research annual research program. TWRI is the federally designated institute for water resources research in Texas.

Dr. Thomas D. McKnight, professor and associate head in Texas A&M's biology department, served as Mandadi's advising professor.

The researchers investigated how gene TAC1, a transcription factor, conferred drought tolerance in *Arabidopsis thaliana,* a common model plant used in plant biology and genetics. Prior to the study, Mandadi and McKnight proved that over-expression of the TAC1 gene in tobacco and tomato plants did result in vigorous drought tolerance without compromising crop yields. In this research, Mandadi said they aimed to characterize further how the gene pathway worked and then use the results to increase drought tolerance in other crops.

The researchers discovered that TAC1 directly targets BT2, a gene they found to be integral to the plant's response to regulatory factors.

"We hypothesized that the TAC1-BT2 pathway in plants was crucial for drought tolerance," Mandadi said. "Surprisingly, our current results demonstrate that BT2 has a much broader role in regulating multiple and diverse environmental signals such as light, hormones, nutrient status, and stresses."

Mandadi plans to apply this basic knowledge to studying the BT2 pathway in other important crop species.

"Genetic engineering of BT2 pathway in crops may help generate plants that are more productive in nutrient limiting soils and/or resistant to biotic and abiotic stresses, including drought," Mandadi said.

For more information on Mandadi's research, visit TWRI's USGS Research Grants Web page.

Ag Demonstration Initiative to host water conservation short course Jan. 20-22

The Lower Rio Grande Valley Agricultural Demonstration Initiative is offering a short course on flow measurement in canals and pipes, **Jan. 20-22, 2010**, in Harlingen.

The two and a half day course will be taught by professionals in irrigation flow measurement and will include important information on the selection, installation, calibration, and operation of the commonly used flow meters for pipes as well as open channel devices such as weirs and flumes. The course is designed for district managers and employees with responsibility or interest in measuring water flows on agricultural land.

Participants will gain knowledge and hands-on experience at the Flow Meter Calibration facility (FMC) in Harlingen, which has a large manifold system with pipes from 6" to 24" diameter together with an open channel equipped with weirs and flumes. Its computer-controlled 10,000-gallon calibration tank and pumping systems provide the precise flows needed for calibration of equipment.

The course is limited to 20 students and advanced registration is requested by Jan. 8. For registration and more information, contact **Tom McLemore**, Harlingen Irrigation District project manager, at 956.423.7015 or tmclemore@hidcc1.org.

Researchers identify what makes deadly algae more toxic

Researchers from Baylor University, Texas A&M University and the University of Texas at Arlington have identified a key component that increases the toxicity of golden algae (*Prymnesium parvum*), which kills millions of fish in the southern United States every year. The study is the first to determine what makes the deadly golden algae more potent in inland waters, according to a Baylor University news release. The results have been published the journal, "Toxicon."

Golden algae has been found in most of the 25 major river systems throughout Texas, including Lake Whitney and Lake Waco in Central Texas, and Lake Granbury in North Texas. Experts understand that several environmental factors influence toxin production, but now new research from these scientists shows that once the toxin is released into the water, its propensity to cause harm to the environment is influenced by the lake's pH level. In fact, the toxins become more potent at higher pH, which the researchers say is interesting because blooms may actually increase pH.

Working in collaboration with **Dr. Daniel Roelke** at Texas A&M University and Drs. **James Grover** and **Kevin Schug** at the University of Texas at Arlington, the Baylor researchers, **Theodore W. Valenti, Jr.**, **Susan V. James, Mieke J. Lahousse**, and **Dr. Bryan Brooks** examined the pH and toxicity of several lakes known for large golden algae fish kills. They also performed laboratory experiments to confirm observations in the field and used computational models to examine physicochemical properties of golden algae toxins at various pH. They found that as the pH level in the lakes increased so did the toxicity of the algae. In fact, the potency of the algae was nearly five times greater at a pH level of 8.5 than it was at 6.5.

To read the Baylor news release, see here. To learn more about TWRI's efforts regarding golden algae see here.

New Publications/Papers

Economic Implications of Biological Control of Arundo donax in the Texas Rio Grande Basin, E. Seawright, M. Rister, R. Lacewell, D. McCorkle, A. Sturdivant, J. Goolsby, C. Yang, B.L. Harris, Texas Water Resources Institute TR-358, 2009

Arundo donax, or giant reed, is a large, bamboo-like plant that is native to Spain and has invaded several thousand acres of the Rio Grande riparian zone in Texas and Mexico. With concern of increased water demands in the Texas Lower Rio Grande Valley region, the United States Department of Agriculture, Agricultural Research Service (USDA)ARS) is investigating four herbivorous insects as potential biological control agents for Arundo donax to facilitate increased water supply. This study examines selected economic implications for agricultural water users in the United States of applying these biological control agents along the Rio Grande. The research includes (a) estimating the value of the water saved due to the reduction of Arundo donax, (b) a benefit -cost analyses, (c) regional economic impact analyses, and (d) an estimate of the per-unit cost of water saved over a 50-year planning horizon (2009 through 2058). The model ArundoEcon© is used to perform a baseline deterministic analyses using low- and high-value irrigated composite acre values.

Salinity Budget and WRAP Salinity Simulation Studies of the Brazos River/Reservoir System, R. Wurbs, C. Lee, Texas Water Resources Institute TR-352, 2009.

Natural salt pollution in the upper watersheds of the Brazos River Basin and other neighboring river basins contribute large total dissolved solids (TDS) loads to the rivers. The objectives of the studies of the Brazos River Basin reported here are (1) to enhance understanding of the occurrence, transport, and impacts of salinity in the Brazos River and Lakes Possum Kingdom, Granbury, and Whitney and (2) to improve salinity simulation capabilities of the Water Rights Analysis Package (WRAP) modeling system. Water volume and TDS load budgets are presented for five river reaches covering about 500 miles of the upper Brazos River. WRAP is applied to model the river basin for alternative modeling premises and water management scenarios. The impacts of salinity and salinity control measures on water supply capabilities are assessed.

TWRI Water Resources Training Courses

Watershed Coordinator Roundtable Meeting	Jan. 27, 2010
Getting In Step Workshop	Jan. 28, 2010
SWAT for Beginners	Feb. 8-9, 2010
Advanced Data Processing for ArcSWAT	Feb. 10, 2010

New Waves is an e-mail newsletter of Texas Water Resources Institute, part of Texas AgriLife Research,

the Texas AgriLife Extension Service, and the College of Agriculture and Life Sciences at Texas A&M University. **New Waves** publishes timely information about water resources news, results of projects and programs, and new water-related research projects, publications, papers and faculty, at universities in Texas.

If you have information for possible inclusion in **New Waves** please e-mail **Leslie Jordan** at lhjordan@ag.tamu.edu, or call 979.862.7139, and include your contact information. All submissions may be edited for grammar and style.

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