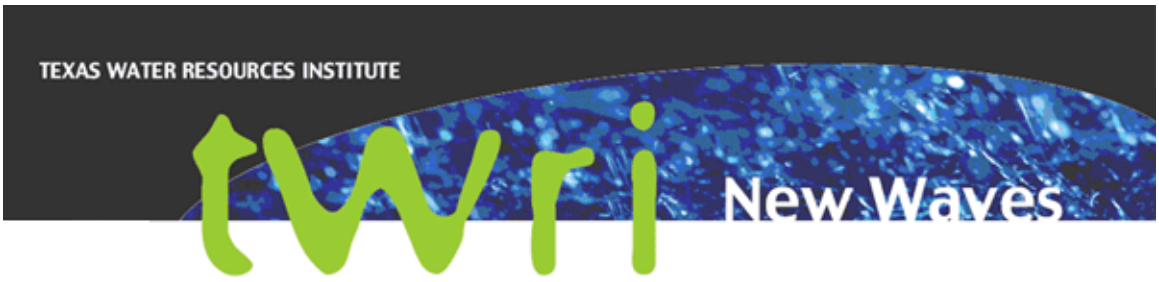

Breaking news about water resources research and education at Texas universities

March 13, 2006

1. Drip Irrigation Is Workable Option for Rolling Plains Cotton

Dr. John Sij, a Texas Agricultural Experiment Station agronomist at Vernon, says subsurface drip irrigation is a workable option for Rolling Plains crop producers. With two years of comparative data at hand and one year's data still in review, Sij believes subsurface drip irrigation has proven its worth on the Rolling Plains.

This research was funded by contributions from the Texas Water Resources Institute, the Cotton Foundation, the Texas Water Development Board and the Texas State Soil and Water Conservation Board.

To read the AgNews story go to http://agnews.tamu.edu/dailynews/stories/SOIL/Feb2006a.htm

2. Student researches endocrine disrupting compounds

Endocrine disrupting compounds (EDC) that remain in the water after wastewater treatment are a concern and were researched by a Southern Methodist University graduate student.

EDCs are chemicals that, in small doses, can interfere with normal hormone production, and can affect the endocrine system in humans and wildlife. SMU environmental engineering graduate student Adrian Dongell and his advising professor, Dr. John Easton, researched various removal strategies of EDCs.

"Any effect on this system [endocrine] could cause reproductive and/or health effects," said Dongell, a recipient of a $5,000 2004-05 Texas Water Resources Institute research grant.

In this study, Dongell collected water samples on a monthly basis for one year at the Dallas Central Wastewater Treatment Plant (WWTP) to determine the levels of hormones entering and leaving the plant. The steroid hormones that he included in his study were 17β-estradiol (E2), progesterone, and testosterone.

In the laboratory, Dongell constructed a bench-scale flow-through system to evaluate the removal of hormones at a typical WWTP. The system included four identical activated sludge reactors, like that of a typical WWTP that treats the waste. A sedimentation tank was used to remove the remaining sludge. Each reactor was operated at different food-to-microorganism (F/M) ratios to achieve a typical range of solids resistance times to study the degradation of hormones.

Dongell operated the units for 10 days to achieve steady-state operation, followed by six days of hormone data collection. The hormone removal range was from 60 percent to 93 percent across

the four reactors. He also observed that the hormone removal rate increased with decreasing the F/M ratios.

He hopes that his findings will promote more researchers to explore other EDC treatment options.

"Activated sludge treatment alone is unlikely to provide enough removal to comply with future regulations of hormone discharges in municipal WWTP effluents, which are designed to protect sensitive aquatic species," said Dongell.

Dongell, originally from Scottsdale, Arizona, is currently residing in Dallas, Texas and is working for Weston Solutions, Inc.

Dongell's research was funded by TWRI through the U.S.Geological Survey, as part of the National Institutes for Water Research annual research program. TWRI is the federally designated institute for water resources research for Texas.

For more information on Dongell's research, visit "USGS Research Grants" at http://twri.tamu.edu.

3. Diffuse reflectance spectroscopy measures soil clay content

With an increased emphasis on precision agriculture and watershed planning, scientists need higher resolution maps of soil properties for improved modeling results and management decisions. One way to obtain these higher-resolution maps is to develop sensors that can rapidly and reliably quantify soil properties *in-situ* (in the field).

Dr. Cristine Morgan, assistant professor, Texas A&M University Soil and Crop Sciences Department, and her research team have found a way to measure the soil clay content, therefore map soil horizons quickly and accurately in the field.

Through a Texas Agricultural Experiment Station (TAES)-funded Water Resources Research Grant, Morgan was able to use diffuse reflectance spectroscopy to predict the clay content with soil depth in fields in the North Bosque River watershed.

Heterogeneity or diversity of soil affects the quality and quantity of water in streams, reservoirs and groundwater. Knowing the soil properties and their spatial distribution at a higher resolution will help scientists improve modeling and management of water on landscapes, Morgan said.

"If researchers can more accurately quantify the soil properties across the field, then farmers can better manage their crops. Knowing the soil properties can also help in decreasing erosion and non-point source pollution," she said.

Soil heterogeneity is not sufficiently captured by the current scale of soil surveys, Morgan said. These surveys map one type of soil within a larger area, too course of scale for precision agriculture and field-scale modeling, she said.

Diffuse reflectance spectroscopy uses optical sensors to measure soil reflectance of visible and near-infrared light, which is correlated to soil physical and chemical characteristics. By using the diffuse reflectance spectroscopy in the field, researchers get a higher resolution of soil information in a shorter time.

Sampling three representative landscapes in the North Bosque River watershed, team members collected 72 soil cores in plastic sleeves and then cut the cores in half vertically. Using, the

spectrometer, they measured soil reflectance *in situ* at the field moisture content, *in situ* as the core dried and of dried and crushed samples passed through a sieve. After making reflectance measurements, they measured the soil clay content in the lab to validate the prediction model.

The results showed that the *in situ* reflectance measurements could measure the clay content of soil very rapidly and the accuracy was within 6 percent clay content, Morgan said.

Travis Waiser, a Soil and Crop Sciences Department master's student and recipient of the 2004-05 Mills Scholarship given by the Texas Water Resources Institute, worked with Morgan on the project.

Morgan said her team hopes to build models for organic and inorganic carbon that can further quantify the soil.

"We think we can improve these measurements by adding auxiliary information," she said.

She also plans to try additional statistical methods to create models that are more accurate and mount a spectrometer onto a soil probe for field mapping.

4. Student researches the removal of atrazine

Texas A&M University soil science graduate student, Timothy Goebel and his advising professors, Drs. Kevin McInnes and Scott Senseman, are researching the removal of the herbicide atrazine from runoff water in agricultural fields.

According to the U.S. Environmental Protection Agency, an estimated 76.4 million pounds of atrazine are applied to agricultural fields annually. Atrazine is used on corn, sorghum, wheat and other crops for controlling broadleaf and some grassy weeds.

Goebel said that his goal is to improve surface water quality by reducing pesticide load in runoff water before it enters streams and rivers.

"This research project attempts to find a solution to a real world problem since pesticide contamination is a current problem which needs to be addressed," said Goebel, recipient of a $5,000 2004-05 Texas Water Resources Institute research grant.

Goebel explained that consumption of atrazine has been linked to health risks in animals and humans. As a contaminant in runoff water, atrazine exists both in the water as well as bound to the soil particles eroded from the fields.

Goebel and his advisors are researching ways to modify current polymers to create an improved polymer that can capture organic contaminants, and suspend and trap them for removal from water. The water, free of contaminants, can then be reused.

"Most polymeric flocculants, such as the widely used polyacrylamides, are effective in removing colloidal material and associated contaminants, but not in removing appreciable amounts of soluble contaminants such as atrazine," he said.

The first polymers he modified were able to remove 400 percent more atrazine from solution than the polymer Magnifloc, but were too small to flocculate as effectively as Magnifloc. The second

polymers that he modified have shown to be effective at flocculating colloidal material and are currently being tested for their ability to remove atrazine from solution.

"The results suggest that bifunctional polymer can be used to help reduce the pesticide load in surface water systems but further testing would be required to determine the overall effectiveness," Goebel said.

Goebel is working to obtain a Ph.D. in soil science and hopes to continue working in the field of environmental chemistry and to eventually become a university professor.

Goebel's research was funded by TWRI through the U.S.Geological Survey, as part of the National Institutes for Water Research annual research program.

For more information on Goebel's research, visit "USGS Research Grants" at http://twri.tamu.edu.

5. Annual report of national water resources organization on-line

The 2006 program executive summary of the National Institutes of Water Resources is available on-line. The report summarizes the accomplishments of the 54 national water resources institutes, including the Texas Water Resources Institute.

The Water Resources Research Act of 1964 authorized establishment of a water resources research and technology institute or center in each state. The institutes were charged with (1) arranging for competent research that addresses water problems or expands understanding of water and water-related phenomena, (2) aiding the entry of new research scientists into the water resources fields, (3) helping to train future water scientists and engineers, and (4) getting results of sponsored research to water managers and the public. The program is administered by the U.S. Geological Survey as the Water Resources Research Act Program under the general guidance of the Secretary of the Interior.

To download the report, go to http://niwr.montana.edu/docs/NIWR_Executive_Summary_2006.pdf.

6. Rice Researchers Focus on Water Conservation

Scientists at the Texas A&M Research and Extension Center in Beaumont are working with the Lower Colorado River Authority to help rice farmers save water. According to Dr. Yubin Yang, senior biosystems analyst, the team is developing a web-based on-farm water conservation analysis tool, called the Rice Water Conservation Analyzer. The tool estimates the potential water savings and evaluates the costs and benefits associated with different on-farm rice water conservation improvements.

To read the AgNews story, go to:
http://agnews.tamu.edu/dailynews/stories/DRGHT/Mar0106a.htm

7. Career Extension Employee Receives Texas Tech Distinguished Alumni Award

Texas Tech University presented a Distinguished Alumni award to Dr. Bob Robinson, regional program director of Texas Cooperative Extension's 66-county North Region. Robinson earned a doctorate from Texas Tech, a bachelor's degree from West Texas A&M University and a master's degree from Texas A&M University, all in the field of animal science.

To read the AgNews story, go to: http://agnews.tamu.edu/dailynews/stories/AGPR/Mar0306a.htm

8. Crop Rotation Adds Value to Irrigation

Texas Agricultural Experiment Station researchers are researching whether crop rotation can add value to irrigation water and help maintain or improve yields in limited irrigation situations.

Jim Bordovsky, Experiment Station agricultural engineer, and other scientists are investigating the feasibility of producing cotton and grain sorghum in rotation using dryland production strategies supplemented by very limited irrigation using efficient delivery systems.

To read the AgNews story, go to: http://agnews.tamu.edu/dailynews/stories/AGEN/Mar0706a.htm

9. Membrane/separations technology "Hands-On" course scheduled

Texas A&M's Separation Sciences Group at the Food Protein Research and Development Center is sponsoring the 16th annual Membrane & Separations Technology short course, April 2-6 in College Station.

"Fundamentals, New Developments, Applications and Pilot Plant Demonstrations" is designed for food, water, chemical, petroleum and environmental industry personnel.

Industry experts and researchers from across the United States and Germany will give lectures on the basic principles, system designs, case studies, membrane & separations equipment selection, and costs & economics of membrane and separations technologies.

Daily pilot plant demonstrations will give attendees a "hands-on" learning experience with separation technologies equipment, said Carl Vavra, program coordinator of the Separation Sciences Group.

"A creative, learning environment will provide many opportunities for everyone to establish a network for their membrane & separation technologies needs," Vavra said.

For more information, go to www.tamu.edu/separations or contact Vavra at cjvavra@tamu.edu or 979.845.2758.

New Projects

"Irrigation Training Program for Texas Agricultural Producers"

This three-year project will develop and provide educational materials and training manuals to implement a statewide Irrigation Training Program for agricultural producers, agency personnel and others. The Texas Water Resources Institute and Texas Cooperative Extension irrigation specialists will develop the curriculum for this training in collaboration with the USDA Natural Resources Conservation Service and Agricultural Research Service and Texas Agricultural Experiment Station. Texas State Soil and Water Conservation Board and local Soil and Water Conservation Districts, partners in the project with TWRI and TCE, will help plan and host the training in major irrigation areas of Texas.

Principal Collaborators: Texas Cooperative Extension, Texas State Soil and Water Conservation Board
Funding Agency: Texas Water Development Board

"Irrigation Water Conservation Demonstration Project"

This project funds the Panhandle Agripartner program for the 2007 growing season. The program uses demonstration sites to collect data for irrigation water use, soil moisture measurements, rainfall, crop growth state, crop yields and other data. Actual irrigation water use is compared to the potential use estimated by the Texas High Plains Evaporation Network.

Principal Collaborator: Texas Cooperative Extension
Principal Investigator: Leon New
Funding Agency: Texas Water Development Board

"Precision Irrigators Network: On-farm Research and Demonstration to Evaluate Irrigation Scheduling Tools in the Wintergarden and Texas High Plains"

This two-year demonstration project will use potential evaporation transpiration data for scheduling and implementing various limited irrigation levels, collection of field data about irrigation water use, crop yield, input costs and other parameters on a weekly basis. Researchers will use existing farm enterprise models to evaluate the input data and make estimates of irrigation water use/economic impacts of current and alternative management practices.

Principal Collaborators: Texas Water Resources Institute, Texas Agricultural Experiment Station, Uvalde and Amarillo
Principal Investigators: Giovanni Piccinni, Daniel Leskovar, Thomas Gerik, Wyatte Harman, Thomas Marek, Bill Harris
Funding Agency: Texas Water Development Board

"News Waves," an email newsletter of Texas Water Resources Institute, 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 items to kwythe@tamu.edu or 979.845.1862 and include your contact information. All submissions may be edited for grammar and style.

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