



SWES SOUNDS

THE UNIVERSITY OF
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COLLEGE OF AGRICULTURE
AND LIFE SCIENCES

The Heartbeat of the Department of Soil, Water & Environmental Science

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TONES FROM THE TOOTH

The development of a “green” society has been an increasingly popular theme in recent years. Associated with the green movement has been an increasing interest in gardening among the general U.S. population. I have received several calls and inquiries seeking my response to this green trend. I think the general trend and particularly the increasing interests in gardening and food production is very positive. This trend may not render a shift in global food supply but very importantly, we see people making the fundamental connection between our environment and food production from this process.



As our nation has become increasingly urban the population has become disconnected from the reality of how and where their food is produced. The sad reality is that most folks have no idea where their food comes from. Too often people in modern society behave like they think all food comes from the market. If we stop and think about and review the immediate world around us we can even find that attitude pretty close to home in our own communities.

So if this is the case, what can we do about it? One simple step to consider is to plant a garden, even a small garden. Very few people actually get out and till the soil, plant some seeds, cultivate the plants, and then have a chance to collect and enjoy the harvest. The simple act of planting a garden will demonstrate what is involved in growing some plants to maturity and harvest. It will also illustrate how easily a crop can be wiped out by something like an insect or disease infestation or by the weather.

Accordingly, this interest in a more sustainable manner of living and the increasing interests in gardening can offer to us an excellent opportunity to help reestablish that fundamental connection with people, the land, the environment, and our food.

Jeffrey C. Silvertooth, Department Head

FEATURED VISITING SCHOLAR

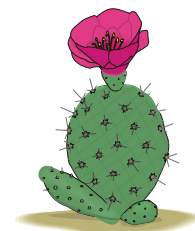
Jon Mainhagu, PhD

Before arriving in Dr. Brusseau’s lab last March, I defended my PhD in Hydro-systems at the National Polytechnic Institute of Loraine in France. My work was on variable physical proprieties in miscible fluid transport in Hele-Shaw cells. Even though my work was based on experimental fluid mechanics, its direct applications are on pollution transport in porous media and remediation, that is why my integration to the Brusseau Contaminant Transport Lab was natural fit.



After a mechanical engineering degree obtained in Limoges, France I came back to my original university of Bordeaux, France to get a Masters in fundamental fluid mechanics. That is when I got accepted on a PhD program in the school of Geology in Nancy, France.

My project at the University of Arizona is a collaboration with the Pacific Northwest National Laboratory to experimentally study the behavior of carbon tetrachloride pollution in the vadose zone. Using a specially constructed flow cell in different configurations we are modeling a field situation in laboratory settings. This apparatus will allow us to do many things: develop field protocols to detect the source of the pollution, map the polluted area, and analyze the transport of the pollutant in both the gas and liquid phase in order to optimize the extraction. This exiting and ambitious project bears all the reasons why I chose to come at the U of A for a Postdoctoral research position, including integrating into a dynamic and welcoming team within Dr. Brusseau’s lab.



DEPARTMENT NEWS:

Congratulations to **Jeffrey Silvertooth** who was selected as a **2010 American Society of Agronomy Fellow**. He will be recognized as an ASA Fellow during the ASA Awards Program in Long Beach, November 2.

Congratulations to **Ian Pepper** who is the recipient of the **2010 ASA Environmental Quality Research Award**. He will be recognized for this honor during the American Society of Agronomy Awards Program in Long Beach, November 2.

Congratulations to **Matthew Levi** who attended the Joint Western Soil Science Society of America - Western Regional Cooperative Soil Survey Conference in Las Vegas, NV in June. He gave a talk and received 2nd place in the graduate student competition, which included a cash reward. Also on a field trip, he saw one of the only Calcic Petrogypsid soils classified in the western states.



Raina Maier served on a National Science Foundation review panel "Dimensions of Biodiversity", July 19-21.

SWES REPORT CARD:

GRANTS:

Megan McEvoy and **C. Rensing**. 2010-2011. BioMetals 2010 Conference. NIEHS, \$8000.

M. Tuller, T. Ferre and S. Saleska, "Acquisition of a DUALEM-21S Electromagnetic Induction Instrument for Large-Scale Subsurface Characterization in Support of Development of SMART Monitoring Systems". TRIF Water Sustainability Program, \$38,138.

PUBLICATIONS:

De-Bashan, L.E., J-P. Hernandez, Y. Bashan, and R.M. Maier. *Bacillus pumilus* ES4: Candidate plant growth-promoting bacterium to enhance establishment of plants in mine tailings. *Environ. Exper. Bot.*, 69:343-352.

He, M., X. Li, S.J. Miller, L. Guo, C. Rensing, and G. Wang. 2010. Characterization and genomic analysis of chromate-resistant and reducing strain *Bacillus* sp. SJ1. *BMC Microbiology*. 10:221.

Perdrial, N., J. N. Perdrial, J.-E. Delphin, F. Elsass, and N. Liewig. 2010. Temporal and spatial monitoring of mobile nanoparticles in a vineyard soil: evidence of nanoaggregate formation. *Eur. J. Soil Sci.* 61: 456-468.

Yoklic, M., M. Knaebe. Integrating Net-Zero Energy and High-Performance Green Building Technologies in Contemporary Housing in a Cold Climate. USDA, FS, Forest Products Laboratory, General Technical Report, FPL-GTR-193

Zerzghi, H., J.P. Brooks, C.P. Gerba, and I.L. Pepper. 2010. Influence of Long-term Land Application of Class B Biosolids on Soil Bacterial Diversity. *J. Appl. Microbiol.* 109:698-706.

PRESENTATIONS:

The following presentations were given at the American Society for Microbiology General Meeting, San Diego, CA, May 23-29.

Elguindi, J., S. Moffitt, S. Raghavan, and **C. Rensing**. Copper surface alterations influence survival of copper-resistant *E. coli*.

He, M, **C. Rensing**, and G. Wang. Identification of ChrI, a potential chromate responsive regulator in the chromate-resistant and reducing *Bacillus cereus* strain SJ1.

Kim, E.H., and **C. Rensing**. Guided by thioethers: the RND way out for copper and silver.

Tores-Urquidy, O.H., **C.P. Gerba, C. Rensing**, and K. Bright. Overcoming reported copper resistance in bacterial strains using a combination of copper and silver ions.

The following presentations were given at the Goldschmidt 2010 Conference "Earth, Energy and the Environment" Knoxville, TN, June 13-18.

Dontsova K., C. I. Steefel, S. Desilets, A. Thompson and **J. Chorover**. Reactive transport modelling of incongruent basalt dissolution in the Biosphere 2 hill-slope experiment.

Perdrial N., A. Thompson and J. Chorover. Mineral transformations and contaminant release dynamics under wetting-drying cycles in lab-weathered Hanford sediments.

Root R.A., S.M. Hayes, C. Schowalter and J. Chorover. Coupled arsenic and sulfur speciation in semi-arid mine tailings.

The following presentations were given at the Biometals 2010 meeting, Tucson, AZ, July 25-30.

Aravind, S., **C. Rensing**, and M.M. McEvoy. Periplasmic sensing of Cu(I)/Ag(I) by CusS.

He, M., X. Li, L. Guo, S.J. Miller, **C. Rensing**, and G. Wang. Characterization and genomic analysis of chromate resistant and reducing *Bacillus cereus* strain SJ1 .

Kang, Y-S., B. Bothner, **C. Rensing**, G. Wang, and T.R. McDermott. On the role of signa 54 in regulating arsenite oxidation.

Kim, E.H., and **C. Rensing**. Guided by thioethers: the RND way out for copper and silver.

Liu, G., X. Li, W. Matty, Y-S. Kang, B. Bothner, **C. Rensing**, G. Wang, and T.R. McDermott. Studies on a putative arsenite binding protein.

The following presentations were given at the International Society for Microbial Ecology Meeting, Seattle Washington, August 22-27.

Neilson, J.W., M. Ortiz, A. Valentín-Vargas, A. Legatzki, W. Nelson, F. Tian, R.A. Wing, C. Soderlund, J. Quade, J.L. Betancourt, and R.M. Maier. Pyrosequencing and clone library analysis of transitions in bacterial diversity along a precipitation gradient through the hyper-arid region of the Atacama Desert, Chile.

Ortiz, M., A. Legatzki, A. Byrne, W. Nelson, J.W. Neilson, R.R. Casavant, R.A. Wing, C. Soderlund, B.M. Pryor, L.S. Pierson III and R.M. Maier. Pyrosequencing reveals the diversity and variability of bacterial communities on speleothem surfaces in Kartchner Caverns.

Legatzki A., M. Ortiz, J.W. Neilson, R.R. Casavant, B.M. Pryor, L.S. Pierson III, and R.M. Maier. Variations in bacterial community structure on ten different speleothems in Kartchner Caverns, Arizona.

Solis-Dominguez, F.A., A. Valentin-Vargas, and R.M. Maier. Influence of inoculated arbuscular mycorrhizal fungi on *Prosopis juliflora* (mesquite) growth and rhizosphere microbial community structure in acidic desert mine tailings.

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Jones, S.B., M. Sakai, and **M. Tuller**. Snowmelt Infiltration and Soil-Water Evaporation Estimates using Heat-Pulse Measurements and Energy Balance Modeling. Spring Runoff/Western Snow Conference, Logan, UT, April 20-21.

Levi, M.R., **C. Rasmussen**, and N. Starman. Predictive Soil Mapping In Arizona's Basin and Range Province. Joint Western Soil Science Soc. of America - Western Regional Cooperative Soil Survey Conference, Las Vegas, NV, June 21-24.

**Megdal S.** Institutional Mechanisms for the Assessment and Management of Transboundary Aquifers: The Importance of Partnerships. UNESCO 2010. 19th Session of the Intergovernmental Council for the International Hydrological Programme. Paris, France, July 7.

Vaughan, M.J.S., **R.M. Maier**, and B.M. Pryor. Examining Culturable fungal diversity from speleothem surfaces in Kartchner Caverns, Benson, Arizona, USA. 9th International Mycological Congress, Edinburgh, Scotland, Aug. 1-6.

Vaughan, M.J.S., **R.M. Maier**, and B.M. Pryor. Culturable fungal diversity from speleothem surfaces in Kartchner Caverns, Benson, Arizona. 2010 Annual Mycological Society of America Meeting, Lexington Kentucky, June 28- July 1.

**Yoklic, M., N. Chalfoun, J. Reynolds, T Burrelsemann, D. Houghton.** Cooltowers: Passive Cooling for Buildings and Spaces in the Arid Southwest, Forum No. F-27, American Solar Energy Society National Solar Conference. Phoenix, AZ, May 17 -27.

## From the SWES Business Office:

Due to the recent health care reform legislation, The Arizona Department of Administration (ADOA) has announced that it will be making some changes to the Benefit Options Plan.

**PLAN YEAR CHANGE:** The benefits plan year will be changing from October 1 through September 30 to January 1 through December 31. As a result, your current benefits coverage will be extended through October, November and December. No action is required for this extension of coverage. Future plan years will remain on a calendar year schedule. **OPEN ENROLLMENT:** Benefits Open Enrollment for the new plan year of January 1, 2011 - December 31, 2011 will be held from November 1 through November 19, 2010.

**COVERAGE FOR DEPENDENT CHILDREN:** On August 9, we announced a Special Enrollment period offered by the Arizona Department of Administration. During this special enrollment, you have the opportunity to add children up to the age of 26 to your medical, dental and/or vision insurance plans. Your children may be married or unmarried, students or non-students, disabled or not disabled, enrolled or not enrolled in the plan at age 18. This special enrollment period is currently open - but ends at 5 p.m. on September 15, 2010. Benefits for newly added children will be effective October 4, 2010. Detailed information on this special enrollment, including how to enroll, is located on the Human Resources website at [http://www.hr.arizona.edu/2010/special\\_enrollment](http://www.hr.arizona.edu/2010/special_enrollment).

## PLANE TALK

Ian Pepper, Director

Vytas Pabedinskas, an MS student in the SWES Department, has undertaken the task of revitalizing the Oasis, an outdoor space at the Environmental Research Laboratory that showcases sustainable practices. The Oasis features cooling towers, innovative shade structures, and an urban garden space with aquatic features. An area of raised beds has been turned into a demonstration garden to teach the public about the use of organic soil amendments generated from composting, worm castings, and fish pond waste water. We would like to invite different clubs



from the university and groups in Tucson to use the space as a community garden. One idea is to have the area refugee advocacy group take responsibility of several beds so that their clients can grow culturally specific foods. There are workshops currently being planned in collaboration with the Tucson Community Food Bank. These workshops will teach basic home gardening skills. Participants will come from households that are in need of food assistance but appreciate the opportunity for a certain level of self-sufficiency by growing their own vegetables in gardens that are installed at their homes by food bank volunteers. Vytas is also supervising vegetable seedling production for the above mentioned home garden program. This will help the food bank save on supplies and reach a greater number of interested participants.



Vytas is working with plant sciences and ABE students to start a polyculture project where hydroponics, tilapia farming, and worm composting will be combined. Manures from the Campus Ag Center and ERL landscape waste will be composted and used as bedding and food supply for the worms. The worms will generate castings which will be used to create a nutrient tea for hydroponic lettuce and herb production. Waste water from fish ponds will be piped through the hydroponic system for added nutrient benefit. This group is looking for individuals eager to learn about worm composting and organic aquaponics to help out with start up and operation. Those interested in the project or any of the other aspects of the Oasis revitalization should contact Vytas at [vpabedin@email.arizona.edu](mailto:vpabedin@email.arizona.edu)

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SWES CHILE ROAST 2010

Thanks to everyone for joining and celebrating this annual SWES event!

