August 2011

USDA-ARS

Land Management and Water Conservation Research Unit

Greetings!

The Land Management and Water Conservation Research Unit (LMWCRU) advances the development of crop production systems to ensure that future generations will have an adequate supply of food, feed, fuel, and fiber. In this issue of the LMWCRU update, we highlight activities of the LMWCRU during the past six months as well as spotlight research on soil quality by one of our scientists. This research is the foundation for sustainable food production, preserving our natural resources, and mitigating climate change. We hope you enjoy this issue of the LMWCRU update.

Spotlight on Research

Ann Kennedy, soil microbiologist, has a passion for the living component of soil. Her research focuses broadly on soil quality, but a more in-depth view will reveal interest in microbial community dynamics affected by land management, biomarker technologies to identify displaced soil, soil bacteria suppressive to grass weeds, weed seed decay, and residue management. Ann's current work on crop residue decomposition, in cooperation with Tami Stubbs at Washington State University, involves characterizing the structural components of residue and understanding the role of soil enzymes in decomposition. Residue decomposition is important in building soil organic matter and protecting soil from erosion. She is also characterizing lipids in oilseed crops and algal communities, which will help to advance biofuel production. For the past few years, Ann and research technician Jeremy Hansen, have been testing the performance of soil bacteria in suppressing the growth of cheatgrass. This technology will be marketed soon, thus providing land managers with another tool to control cheatgrass (downy brome), jointed goatgrass and medusahead infestations. Ann is also developing principles and methodologies to better understand how microbes impact soil quality. In addition to research, Ann has been actively involved in furthering public awareness of agriculture and science by working with K-12 teachers to bring science into the classroom.

LMWCRU News

Interns

Elsa Cervantes was a student intern examining the fate of nitrogen in soils. She worked for **Jeff Smith** as part of the "Pumping Up the Math and Science Pipeline" program.

Graduate Students

David Huggins served on the graduate committee for Benjames Derrick whose Masters of Science project was "Examining the Potential Usage of Terra Preta Soils to Improve Sustainability in Tropical Agro-ecosystems for Rainforest Conservation."

Invitations

David Huggins gave a presentation on direct seeding at Field Days in St. John, WA in June 2011.

Ann Kennedy presented information on biocontrol and soil science at the Bureau of Land Management Pesticide Certification Program in Denver, CO; Salt Lake City, UT; and Boise, ID during January-March 2011.

Ann Kennedy gave seminars and a field tour at the Columbia Basin Landscapes Workshop "Linking Science and Management to Improve Restoration Success in the Shrub Steppe" in Kennewick, WA during April 2011.

Ann Kennedy gave presentations on wheat residue decomposition, soil quality, organic matter and tillage at Field Days in Lind, Wilbur and St John, WA in June 2011.

Ann Kennedy organized a July 2011 workshop for teachers where they learned about soils and the Smithsonian 'Dig-It' Exhibit. The exhibit will be coming to Spokane, WA February-September 2012.

Frank Young gave presentations on growing canola at an Oilseed Crop Production Workshop in Okanogan, Reardon, and Colfax, WA during January 2011.

Frank Young gave presentations on winter canola, herbicide efficacy for feral rye control, and spring canola in Douglas and Okanogan Counties, WA during June 2011.

Awards/Recognition

David Huggins received the Team Interdisciplinary Award as part of the Climate Friendly Farming research project at the College of Agricultural, Human, and Natural Resource Sciences 52nd Annual Awards Banquet.

From left—Claudio Stockle-Washington State University, Chad Kruger-Washington State University, David Huggins, and Dan Bernardo-Washington State University

Grants

David Huggins, **Brenton Sharratt**, and **Frank Young**, in cooperation with Washington State University and other ARS and University scientists, received a grant from the USDA-NIFA to identify the role of crop management in mitigating or adapting to climate change.

Jeff Smith received a grant from the USDA to examine carbon sequestration and greenhouse gas emissions from switchgrass and hybrid poplar grown for bioenergy.

Upcoming Activities

August 2011

David Huggins will meet with Regional Approaches to Climate Change (REACCH) scientists in Pendleton, OR to discuss multidisciplinary integration of REACCH project objectives. REACCH is a three-state research, education and outreach project funded by the USDA competitive grants program.

Ann Kennedy will present information on biocontrol and soil quality during a Landscape Conservation Cooperative webinar.

October 2011

David Huggins, **Ann Kennedy**, **Brenton Sharratt**, and **Jeff Smith** will present information on air/soil quality and soil carbon/ nitrogen to the Soil Science Society of America, San Antonio, TX.

Frank Young will make a presentation on agronomic practices to improve canola production at the Future Energy Conference, Seattle, WA.

December 2012

Ann Kennedy will present a seminar on soil quality and cheatgrass control to the Colorado Weed Management Association, Colorado Springs, CO.

David Huggins, **Brenton Sharratt**, and **Jeff Smith** will present information on soil carbon, nutrient cycling, and airborne particulates to the American Geophysical Union, San Francisco, CA.

January 2012

Ann Kennedy will make a presentation on soil quality to the Society for Range Management, Spokane, WA.

Recent Publications

- **Huggins, D.R**., Karow, R.S., Collins, H.P., Ransom, J.K. 2011. Introduction: Evaluating long-term impacts of harvesting crop residues on soil quality. Agronomy Journal 103:230–233.
- Ibrahim, H.M. and **D.R. Huggins**. 2011. Spatio-temporal patterns of soil water storage under dryland agriculture at the watershed scale. Journal of Hydrology 404:186–197.
- Collins, D.P., C.G. Cogger, **A.C. Kennedy**, T.Forge, H.P. Collins, A.I. Bary and R. Rossi. 2011. Farm-scale variation of soil quality indices and association with edaphic properties. Soil Science Society of America Journal 75:580-590.
- Pritchett, K.A., **A.C. Kennedy**, and C.G. Cogger. 2011. Management effects on soil quality in organic vegetable systems in western Washington. Soil Science Society of America Journal. 75:605-615.
- **Sharratt, B.S.** 2011. Size distribution of windblown sediment emitted from agricultural fields in the Columbia Plateau. Soil Science Society of America Journal 75:1054-1060.
- **Sharratt, B.S.** and R. Edgar. 2011. Windblown dust and PM10 Air Quality Standards within the Pacific Northwest. Atmospheric Environment 45:4626-4630.
- Feng, G., **B. Sharratt**, and **F. Young**. 2011. Influence of long-term tillage and crop rotations on soil hydraulic properties in the Pacific Northwest. Journal of Soil and Water Conservation 66:233-241.
- **Young, F.** 2011. Building a Lasting Partnership. US Canola Digest 3:18-19.

LMWCRU Support Staff

The LMWCRU support staff is critical to the overall operation of our research program. Without this support, we would not be able to carry out the day-to-day administrative requirements of the agency or a diverse and productive research program. Support staff from left to right in the photo include: Alex Davis and Elsa Cervantes, student employees helping to characterize nitrogen and trace gases in soils; **David Uberuaga** helps in carrying out field and laboratory experiments pertinent to advancing direct seed and precision agriculture systems; **Carla DesVoigne** provides administrative program support to the unit; **Debbie Bikfasy** provides technical support in collecting and analyzing data relevant to enlarging our understanding of nutrient cycling and trace gas emissions; **Derek Appel** manages field operations at the Palouse Conservation Field Station and assists scientists in the field; **Bob Barry** provides support in carrying out field and laboratory experiments that evaluate management practices for controlling wind erosion and improving air quality; **Larry McGrew** helps in collecting and analyzing field data pertinent to developing diversified cropping systems in the drier part of the Columbia Plateau; **John Morse** helps maintain the infrastructure of the Palouse Conservation Field Station and provides technical support to scientists in the laboratory and field; and **Jeremy Hansen** provides support in carrying out field and laboratory experiments relevant to advancing sustainable cropping systems and preserving environmental quality.

LMWCRU Scientists:

Brenton Sharratt, Research Leader, Particulate Emissions

David Huggins, Nutrient Cycling

Ann Kennedy, Soil Quality

Jeff Smith, Greenhouse Gas Emissions

Frank Young, Cropping Systems

Contact us at:

Land Management and Water Conservation Research Unit

P. O. Box 646421, Pullman, WA 99164-6421

Phone: 509-335-1552; Fax: 509-335-3842; E-mail: Brenton.Sharratt@ars.usda.gov

We're on the web! http://ars.usda.gov/pwa/pullman/lmwcru