February 2011

USDA-ARS

Land Management and Water Conservation Research Unit

Greetings!

In accordance with USDA research priorities, the Land Management and Water Conservation Research Unit (LMWCRU) is striving to mitigate the effects of agricultural practices on climate change. In this issue of the LMWCRU update, we highlight activities of the unit during the past six months as well as spotlight research on climate change by one of our unit scientists. This research is not only important to mitigating the impact of agriculture on climate change, but also in conserving soil carbon and nitrogen that are integral to the productivity and quality of the soil resource. We hope you enjoy this issue of the LMWCRU update.

Liaison Committee

LMWCRU scientists met with our Liaison Committee in Pullman on February 1, 2011. The committee was formed in late 2010 to aid the unit in disseminating information to stakeholders and customers as well as providing input and direction to the unit research program. The committee consists of growers and representatives from industry, state and federal agencies, commodity organizations, and Washington State University. Administrators from the USDA-ARS National Program Staff and Pacific West Area Office also attended our meeting. The meeting culminated in discussing issues important to the current and future state of crop production in the Pacific Northwest.

Spotlight on Research

Jeff Smith, soil biochemist, is concerned about the fate of organic and inorganic carbon and nitrogen in soils.

Carbon and nitrogen are readily found in nature, but the various forms of these elements can affect plant uptake, soil health, and climate change. Jeff is examining transformations of nitrogen in soils, carbon and nitrogen transport from agricultural land to surface waters, and emission of trace gases (CO_2 and N_2O) from soils into the atmosphere. His work on trace gases is part of a network of 25 other USDA-ARS locations which are quantifying the emission of N_2O from soils. His work on nitrogen fertilizers indicates that the emission of N_2O is low for soils in the Palouse region of eastern Washington regardless of the type of nitrogen fertilizer applied to the soil. In fact, Jeff's research suggests that the loss of nitrogen fertilizer via the emission of N_20 to the atmosphere is less than the standard (1% of that applied) found in most other regions of the United States. His research on trace gases continues for different soils and precipitation zones in the Inland Pacific Northwest.

LMWCRU News

Welcome

- **Alexandra Davis** who is assisting **Jeff Smith** as a Biological Science Aid.

Visiting Scientists

- **Ann Kennedy** hosted Sieglinde Snappe from the W.K. Kellogg Biological Station in Michigan in September 2010 to discuss agroecosystem dynamics.

Awards/Recognition

- **Frank Young's** publication on Integrated Weed Management in Weed Technology was a featured article for a press release.
- **Frank Young** was interviewed by USDA-ARS Radio regarding his contributions to canola research and partnership in north-central Washington.
- **Frank Young's** research on canola was highlighted in the October 2010 issue of the ARS magazine (available at http://www.ars.usda.gov/is/AR/archive/oct10).
- **Derek Appel** received commendation for 10 years of service to the Federal Government.

Outreach

- **Ann Kennedy** demonstrated the importance of soil to second graders at the September 2010 Field Days hosted by the Range and Meadow Forage Management Research Unit, Burns, OR.

Graduate Students

- **Jeff Smith** served on the graduate committee for Josh Kendall whose Master of Science thesis was "Soil carbon dynamics during the transition to cellulosic ethanol feedstock production".

Recent Publications

- Anderson, J.V., E.P. Fuerst, T. Tedrow, B. Hulke, and **A.C. Kennedy**. 2010. Activation of polyphenol oxidase in dormant wild oat caryopses by a seed-decay isolate of Fusarium avenaceum. Journal of Agriculture and Food Chemistry 58:10597-10605.
- Lupwayi, N.Z., **A.C. Kennedy**, and R.M. Chirwa. 2011. Grain legume impacts on soil biological processes in sub-Saharan Africa. African Journal of Plant Science 5:1-7.
- de Luna, L. Z., **A.C. Kennedy, J.C. Hansen,** T.C. Paulitz, R.S. Gallagher, and E.P. Fuerst. 2011. Mycobiota on wild oat (Avena fatua L.) seed and their caryopsis decay potential. Plant Health Progress (available online at http://www.plantmanagementnetwork.org/php/) .
- **Sharratt, B.S**., L. Wendling, and G. Feng. 2010. Windblown dust affected by tillage intensity during summer fallow. Aeolian Research 2:129-134.
- Feng, G., **B. Sharratt,** and **F. Young**. 2011. Soil properties governing soil erosion affected by cropping systems in the US Pacific Northwest. Soil & Tillage Research 111:168-174.
- **Smith, J.L.,** H. Collins and V.L. Bailey. 2010. The effect of young biochar on soil respiration. Soil Biology & Biochemistry 42:2345-2347.
- Bailey, V.L., S.J. Fansler, **J.L. Smith**, and H. Bolton Jr. 2010. Reconciling apparent variability in effects of biochar amendment on soil enzyme activities by assay optimization. Soil Biology & Biochemistry 43:296-301.
- Garten, C.T. Jr., D.J. Brice, H.F. Castro, R.L. Graham, M.A. Mayes, J.R. Phillips, W.M. Post III, C.W. Schadt, S.D. Wullschleger, D.D. Tyler, P.M. Jardine, J.D. Jastrow, R. Matamala, R.M. Miller, K.K. Moran, T. Vugteveen, R.C. Izaurralde, A.M. Thomson, T.O. West, J.E. Amonette, V.L. Bailey, F.B. Metting, and **J.L. Smith**. 2011. Response of "Alamo" switchgrass tissue chemistry and biomass to nitrogen fertilization in west Tennessee, USA. Agriculture Ecosystem and Environment 140: 289-297.
- **Young, F.L**., D.A. Ball, D.C. Thill, J.R. Alldredge, A.G. Ogg Jr., and S.S. Seefeldt. 2010. Integrated Weed Management Systems Identified for Jointed Goatgrass in the Pacific Northwest. Weed Technology: 24: 430-439.

Grants

- **David Huggins** and **Jeff Smith**, in association with scientists from Washington State University and Cascadia Carbon Institute, received a USDA grant to examine carbon sequestration, nutrient bioavailability, and environmental services from organic agriculture.

- **Jeff Smith**, in association with scientists from the USDA-ARS, Washington State University and GreenWood Resources, received a USDA grant to examine carbon sequestration and greenhouse gas emission from sustainable intercropping of switchgrass and hybrid poplar for bioenergy production.

- **David Huggins** and **Jeff Smith**, in association with scientists from Washington State University and the University of Idaho, received a grant from USDA to investigate site-specific climate-friendly farming.

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

Upcoming Activities

February 2011

- **Jeremy Hansen** will meet with researchers at the Utah State Biofuels Laboratory, Logan, UT;
- **David Huggins** will attend the Feedstock Partnership meeting in Knoxville, TN;
- **Ann Kennedy** will provide instruction on soil science and biocontrol at the BLM Pesticide Certification Program in Boise, ID;
- **Brenton Sharratt** will attend a regional coordinator's meeting for the USDA Biomass Research Centers in Beltsville, MD;
- **Frank Young** will give a talk on canola at the Direct Seed meeting, Lewiston, ID.

March 2011

- **David Huggins** will attend the Western Nutrient Management Conference in Reno, NV;
- **Ann Kennedy** will provide instruction on soils and biocontrol at the BLM Pesticide Certification Program in Denver, present "Expanding Your Horizons" to Pasco Junior High School students, and present a seminar at the Intermountain Native Plant Summit at Boise State University;
- **Brenton Sharratt** will attend a customer workshop for the USDA Biomass Research Centers in Denver and the Sustainable Aviation Fuels Northwest workshop in Seattle, WA;
- **Frank Young** will make a presentation at the Western Society of Weed Science meeting in Spokane, WA.

April 2011

- **Ann Kennedy** will present a seminar at the Columbia Basin Landscape Workshop in Kennewick, WA.

May 2011

- **Ann Kennedy** will provide a soils demonstration to fifth graders at Lind Fifth Grade Field Day;
- **Jeff Smith** will make a presentation to the Soil Ecology Society in British Columbia, Canada.

Contact us at:

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