

USDA-ARS

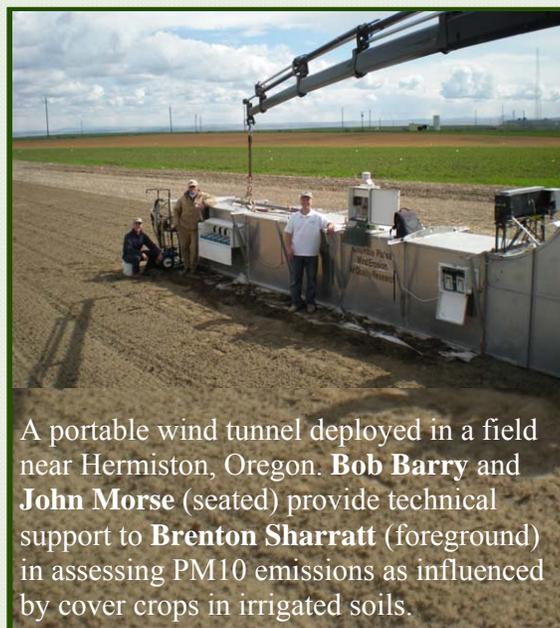
Land Management and Water Conservation Research Unit

Greetings!

The Land Management and Water Conservation Research Unit (LMWCRU) is committed to advancing agricultural practices and technologies that improve the efficiencies and performance of cropping systems and quality of our natural resources. In this issue of the LMWCRU update, we highlight the activities of the LMWCRU during the past six months as well as spotlight research on managing crops and soils to control wind erosion by one of our Unit scientists. This research is vital to developing reliable and accurate prediction technologies and improving air quality throughout our region. We hope you enjoy this issue of the LMWCRU update.

Spotlight on Research

For the past decade, **Brenton Sharratt** has been examining the performance of wind erosion prediction technologies and tillage and crop residue management systems for mitigating wind erosion and emission of PM10 (particles $\leq 10 \mu\text{m}$ in diameter regulated by the US EPA as an air pollutant) from agricultural lands in the drier areas of the Inland Pacific Northwest. Wind erosion not only degrades soil quality, but also reduces visibility along roadways and impairs air quality in the region. In collaboration with growers and Washington State University scientists, our research suggests that prediction technologies can be improved through a better understanding of the physical characteristics that affect erosion of our unique loessial soils. In addition, the occurrence of wind erosion can be mitigated by intensifying crop rotations, or in those areas where winter wheat - summer fallow is the most economical rotation, by adopting practices that maintain crop residue on the soil surface. For example, our research indicates undercutter tillage enhances residue cover and reduces PM10 emissions by 30 to 70% as compared with conventional tillage during summer fallow. Continued efforts in developing practices that reduce wind erosion and PM10 emissions will help minimize road closures and traffic fatalities, improve soil quality, and ensure compliance with federal air quality standards.



A portable wind tunnel deployed in a field near Hermiston, Oregon. **Bob Barry** and **John Morse** (seated) provide technical support to **Brenton Sharratt** (foreground) in assessing PM10 emissions as influenced by cover crops in irrigated soils.

LMWCRU News

Upcoming Invited Presentations

- **February 2013**

David Huggins is invited to give a presentation on “Soil acidification, diagnosis and solutions” to the Pomeroy Conservation District in Pomeroy, WA and on “Will a shot of lime cure your pH heartburn?” at the Pacific Northwest Direct Seed Association in Spokane, WA. David is also invited to speak on soil acidification to the Washington Grain Commission in Pullman, WA and on “Dynamic land use change: bioclimatic variables” at the Regional Approaches to Climate Change (REACCH) annual meeting in Portland, OR.

Ann Kennedy is invited to give a presentation on “The science of soil” and “Cheating the cheatgrass” to the US Bureau of Land Management in Albuquerque NM.

Frank Young is invited to contribute to a presentation on “Increasing residue and soil moisture in the low-rainfall zone” at the Regional Approaches to Climate Change (REACCH) annual meeting in Portland, OR.

- **March 2013**

David Huggins is invited to give a presentation on “Spatial variability and on-farm observations to guide nutrient management” at the Western Nutrient Management Conference in Reno, NV.

Ann Kennedy is invited to talk on “The science of soil” and “Cheating the cheatgrass” to the US Bureau of Land Management in Boise, ID, and on “Weed-suppressive bacteria: cheating the cheatgrass” at the Channeled Scablands Cooperative Weed Management Area annual spring workshop, Cheney, WA.

Brenton Sharratt is invited to give a talk on “Sustainable dryland cropping systems to enable bioenergy security in the United States” at the International Conference on Dryland Development in Beijing, China.

Frank Young is invited to make a presentation on “Feral Rye control in winter canola” at the Western Society of Weed Science meeting in San Diego, CA and invited to present webinar to Idaho Wheat Growers on Russian Thistle control in summer fallow.

Welcome

- Jason Morrow and Jake Waverin, graduate students pursuing Master of Science degrees, and Harsimran Kaur, graduate student pursuing a Doctor of Philosophy degree, are working in the laboratory of **David Huggins**.
- Laban Molsee, an Associate in Research at Washington State University, is working in the laboratory of **Frank Young**.

Grants

- **Ann Kennedy**, in collaboration with Washington State University scientists, received a grant from the US Fish and Wildlife Service to advance research on suppressing weed growth using soil bacteria.
- **Frank Young**, in collaboration with Washington State University scientists, received grants from the Washington State Biofuels Project and the Washington Canola / Rapeseed Commission to accelerate research on canola.

Farewell

- David Uberuaga resigned from the USDA-ARS after providing technical support to **David Huggins** for 10 years. David accepted a position with Washington State University to oversee the management of several farms near Pullman, WA.

Graduate students

- **David Huggins** served as research advisor to Triven Pillai who completed a thesis on “Comparative analysis of soil properties and economic return of alternative farming systems” for a Master of Science degree in Soil Science.

Media News

- **Frank Young** was interviewed by Wheat Life concerning management of jointed goatgrass.

Recent Publications

Our Recent Publications are scholarly professional publications that convey information from original research. Below each citation is a brief description of the major research finding. When available, links are provided to the articles.

- Unger, I., K.W. Goyne, **A.C. Kennedy**, R.J. Kremer, J.E.T. McLain, and C.F. Williams. 2012. [Antibiotic effects on microbial community characteristics in soils under conservation management practices](#). Soil Science Society of America Journal 77:100–112.
- Brown, T.T. and **D.R. Huggins**. 2012. [Soil carbon sequestration in the dryland cropping region of the Pacific Northwest](#). Journal of Soil and Water Conservation 67:406-415.
- C. Stöckle, S. Higgins, A. Kemanian, R. Nelson, **D. Huggins**, J. Marcos, and H. Collins. 2012. [Carbon storage and nitrous oxide emissions of cropping systems in eastern Washington: A simulation study](#). Journal of Soil and Water Conservation 67:365-377.
- Feng, G., **B.S. Sharratt**, and V. Vaddella. 2012. [Windblown soil crust formation under light rainfall in a semiarid region](#). Soil and Tillage Research 128:91-96.
Soil crust formation and thickness were estimated from rainfall since the last disturbance. This relationship will improve our ability to predict wind erosion of loessial soils throughout the Columbia Plateau.
- G. Nyamadzawo, J. Gotosa, J. Muvengwi, M. Wuta, J. Nyamangara, P. Nyamugafata and **J. L. Smith**, [The Effect of Catena Position on Greenhouse Gas Emissions from Dambo Located Termite \(*Odontotermes transvaalensis*\) Mounds from Central Zimbabwe](#), Atmospheric and Climate Sciences 2(4):501-509. 2012.
- Kelley, C.J., Keller, K.C., Evans, R.D., Orr, C.H., **Smith, J.L.** and Harlow, B.A. [Nitrate-nitrogen and oxygen isotope ratios for identification of nitrate sources and dominant nitrogen cycle processes in a tile-drained dryland agricultural field](#). Soil Biology and Biochemistry. 57:731-738. 2012.

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

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