

CropS/PI P 403/503 Advanced Cropping Systems

Fall 2008, 3 Credits

Time: W, F 12:45-2:00; Field trips required

Place: 207 Johnson Hall

Prerequisite: CropS 201 or graduate standing.

INSTRUCTOR

Scot Hulbert, Cook Chair for Cropping Systems Pathology,
307 Johnson Hall. Phone 335-3722; Email scot_hulbert@wsu.edu

OBJECTIVES

- Gain an understanding of the diverse dryland and irrigated cropping systems of the Pacific Northwest and other regions, and the factors that are changing these cropping systems.
- Develop your own opinions about controversial agricultural issues like soil and water conservation, chemical use, organic certification, genetically modified organisms and legislation affecting farming methodology.
- Learn to critically interpret agronomic literature.

GRADING:

403 and 503 credit:

Six quizzes (25 points each).

Participation in class discussions (50 points).

Participation in field trips (These are required, but can be made-up if you can't attend one).

503 Credit: two cropping systems research paper/highlights (~20-30 minutes each; combined worth of 50 points). One must be done before Thanksgiving.

403 Credit: Lead two brief (~ 5 minute) discussions of popular press or current event topics on something to do with Ag. (e.g. newspaper article, website, extension publication, etc.); This is required but not graded. One must be done before Thanksgiving.

STUDY HABITS: Complete reading assignments prior to class. Be prepared to both discuss the papers and ask questions about things you don't understand. Quizzes will cover information from assigned reading as well as highlights of other papers presented by students or instructor in class. Any topics already covered in class are potential material for quizzes.

STUDENTS WITH DISABILITIES: Reasonable accommodations are available for students with a documented disability. If you have a disability and may need accommodations to fully participate in this class, please visit the Disability Resource Center (DRC). All accommodations MUST be approved through the DRC (Admin Annex Bldg, Room 205). Please stop by or call 509-335-3417 to make an appointment with a disability specialist.

COURSE TOPICS (in approximate order):

Introductions;

- Factors affecting changes in cropping systems
- review of tillage implements and strategies
- review of crop rotations

- review of erosion problems

Regional agricultural issues

Environmental and economic effects of managing water

Conservation tillage and the environment

Impact of herbicide resistant (HR) crops

Weed management

Herbicide resistance in crops and weeds

Integrated methods for disease and pest control

Legislation promoting conservation agriculture

Precision agriculture

Current uses, future potential

Organic agriculture

The rules, sustainability, productivity

Sustainable Ag: what is it?

Energy Crops

Pro's and Con's

Global warming and renewable energy

Perennial Crops

Advantages and disadvantages

Development of perennial varieties of annual crops

Additional Topics (topics we may cover based on interest)

Effects of other transgenics (besides HR) on cropping systems

Fixation of nitrogen in cropping systems

Intercropping, including agroforestry and livestock

Developing crops for specific cropping systems: No-till; organic etc.

Insecticide resistance management

Legislation that affects cropping systems

Field Trips:

Aeschliman Farm (late September)

Another Farm (late September)

Affinity Farms (late September)

Precision Agriculture at the Cook farm (early October)

Biodiesel production (early November)

Sources of current events information and applied research:

Capital Press <http://www.capitalpress.info/> (online or hardcopy weekly newspaper)

Agriculture online <http://www.agriculture.com>

Ag biotech news:

<http://www.isb.vt.edu>

<http://www.gmobelus.com>

ASSIGNED READING MATERIAL:

W.F. Schillinger, R.I. Papendick, S.O. Guy, P.E. Rasmussen and C. van Kessel (2003) Dryland cropping systems in the Western United States. PNW tillage handbook series # 28.

Conservation Tillage and Plant Biotechnology. Publication from Conservation Technology Information Center.

- R. L. Anderson (2005) A Multi-Tactic Approach to Manage Weed Population Dynamics in Crop Rotations
Agron J 97:1579-1583
- NAWG Weed Resistance Learning Module <http://www.wheatworld.org/WRMC/>
- Mallory-Smith, C. et al. (2000) Herbicide-Resistant Weeds and their management. Pacific Northwest Extension publication.
- Paulitz T.C., et al. (2002) Insights into the prevalence and management of soilborne cereal pathogens under direct seeding in the PNW, USA. Can. J. Plant Pathol. 24:416-428.
- Gleisman, S.R. (2007) Agroecosystem diversity and stability: Chapter 16 in *Agroecology, the ecology of sustainable food systems*.
- Barker, K.R, and Sorenson, C. (2003) Cropping Systems and Integrated Pest Management. Journal of Crop Production. 8: 271-305
- Koch & Khosla (2003) Role of Precision Agriculture in Cropping Systems. Journal of Crop Production 9:361-381
- Pierce and Nowak, 1999. Aspects of Precision Agriculture. Advances in Agronomy, 67:1-75. *Read section on 'Managing Variability'*
- Kristiansen, P., A. Taji, and J. Reganold. 2006. Organic Agriculture: opportunities and challenges In P. Kristiansen, A. Taji, and J. Reganold (eds.) Organic Agriculture: A Global Perspective. CSIRO Publishing, Collingwood, Victoria, Australia. In Press.
- National Organic Program: Regulations: (*selected text*)
- Hill et al. (2006) Environmental, economic, and energetic costs and benefits of biodiesel and ethanol biofuels. PNAS 130:11206-11210
- Biomass as Feedstock for a Bioenergy and Bioproducts Industry: The technical Feasibility of a Billion Ton Annual Supply. <http://www.osti.gov/bridge>
- Keith et al. Sinks and Energy crops *Climatic Change* 49: 1–10, 2001.
- Lal, R., and Pimentel, D. (2007) Biofuels from crop residues. Soil & Tillage Research 93:237-238 (editorial)
- Tilman, D. (2006) Carbon-negative biofuels from low-input high-diversity grassland biomass. Science 1598-1600
- Glover et al. (2007) Future Farming: A return to roots? Scientific American, August 82-89
- Gleisman, S.R. (2007) Animals in Agroecosystems: Chapter 19 in *Agroecology, the ecology of sustainable food systems*.

Additional papers/readings/websites we will discuss:

- Schillinger, W.F., and D.L. Young. 2004. Cropping systems research in the world's driest rainfed wheat region. Agronomy Journal 96:1182-1187.
- Behrens et al. (2007) Dicamba resistance: Enlarging and preserving Biotechnology-based weed management strategies.
- Controlling root and crown diseases of small grain cereals: Smiley, Cook Paulitz
CSP section of Farm Bill
- Comparisons of organic and conventional Ag <http://www.fibl.org/english/research/soil-sciences/dok/index.php>
- Tilman, D., et al. (2002) Agricultural sustainability and intensive production practices. Nature 418: 671-677
- Schiermeier et al. (2008) Electricity without carbon. Nature 454:816-823
- Cox et al. (2006) Prospects for developing Perennial grain crops; Bioscience 56:649-659
- Transgenic crops approved by federal agencies (nonregulated)
http://www.aphis.usda.gov/brs/not_reg.html
- Gleisman, S.R. (2007) The agroecosystem concept: Chapter 2 in *Agroecology, the ecology of sustainable food systems*.