

Freshman Seminar - AS 137 - proposed for Winter Quarter 2011

DRAFT SYLLABUS

## Seeds for a sustainable future: conserving plant biodiversity for human benefit

1 credit, S/U

**INSTRUCTOR:** Pablo Jourdan, Director of the Ornamental Plant Germplasm Center  
Department of Horticulture and Crop Science  
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292-3708

**MEETING TIMES:** Wednesdays, 4 pm

**LOCATION:** Howlett Hall Greenhouse Classroom (HG 117)

### **COURSE GOALS:**

The primary goal of this course is to make students aware of the close relationship between biodiversity and human affairs. Plant biodiversity and its utilization and management will be used as a vehicle to demonstrate how humans are responsible for effective management of genetic resources that is essential for a sustainable future.

Upon completion of the course the following objectives should be met:

- 1)** understand what are genetic resources and how they are manipulated in agriculture
- 2)** reflect on the role of conservation and utilization in insuring a sustainable supply of plant genetic resources
- 3)** understand the role of gene banks in preserving genetic resources

**DESCRIPTION:** This seminar course seeks to provide a broad perspective on the role of plant biodiversity in human affairs. The decline in biodiversity is an issue of such global concern that a Convention on Biological Diversity was developed by the United Nations in 1992 to address the need for conservation and appropriate use. This use and manipulation of plant biodiversity will be a major theme for the course and the focus will be on the interplay of genetic resources, wild species, plant breeding, and conservation (both on-site and off-site). We will explore questions such as: Why are plant genetic resources important? Why should they be conserved? How can we conserve these resources for a sustainable future? Examples will be primarily derived from agricultural activities to demonstrate that because the world's food supply is based on intensive agriculture, which relies on genetic uniformity, there is increased vulnerability of crop plants to potentially serious pests, diseases and other stresses (including climate change) due to this uniformity. Plant biodiversity plays a key role in addressing this problem.

The Ornamental Plant Germplasm Center, located on the Ohio State University campus in Columbus is an example of a genebank that focuses on the need for conservation of plant genetic resources. This center will be used as an example of how global issues of plant biodiversity conservation can be addressed.

**PREREQUISITES:** none

**GRADING:** S/U - students must achieve a 70% of credit to earn a Satisfactory grade

Grading Activity	% of Credit	Description
Attendance	10%	as a seminar course, student participation is critical so attendance is required
Thought essays on selected topics	2 x 25% (=50%)	Specific issues related to biodiversity, genetic resources, and conservation will be provided in class. Students will be expected to examine the issue and provide a brief essay (750 words) addressing the issue.
Topical reports (web-based searches)	20%	Students will explore the Web for news, blog postings, images, and other information related to 3 of the topics presented in class. A summary of a particular entry must be provided.
Final (take-home) exam	20%	A synthesis of the major issues presented in the course will be achieved by a take-home exam.

**REFERENCES:** No textbook will be required. On-line resources will be provided and selected chapters/sections of appropriate books will be made available on reserve.

Seeds for a Future. The U.S. National Plant Germplasm System

([http://sun.ars-grin.gov/npgs/Seeds\\_for\\_Our\\_Future\\_Revised\\_1996.pdf](http://sun.ars-grin.gov/npgs/Seeds_for_Our_Future_Revised_1996.pdf))

Kingsbury, Noel (2009) Hybrid: The History and Science of Plant Breeding. University of Chicago Press. (Selected chapters will be assigned)

Gepts P (2002) A comparison between crop domestication, classical plant breeding, and genetic engineering. *Crop Sci* 42:1780-1790

Gepts P (2004) Who owns biodiversity and how should the owners be compensated? *Plant Physiology* 134:1295-1307

Web Resources:

Plant Breeding Overview:

<http://www.eu-sol.net/public/plant-breeding/find-out-more/introduction#top>

Crop Genebank Knowledge Base

<http://cropgenebank.sgrp.cgiar.org/>

Biodiversity International

[http://www.biodiversityinternational.org/scientific\\_information/themes/genebanks/overview.html](http://www.biodiversityinternational.org/scientific_information/themes/genebanks/overview.html)

**ACADEMIC MISCONDUCT** “Academic misconduct” includes all forms of student academic misconduct wherever committed; illustrated by, but not limited to, cases of plagiarism and dishonest practices in connection with examinations, quizzes, reports, term papers, etc. All instances of alleged academic misconduct will be appropriately reported. Further information on misconduct is available in the Code of Student Conduct ([http://studentaffairs.osu.edu/info\\_for\\_students/csc.asp](http://studentaffairs.osu.edu/info_for_students/csc.asp)).

**DISABILITY SERVICES** Students with disabilities that have been certified by the Office for Disability Services will be appropriately accommodated, and should inform the instructor as soon as possible of their needs. The Office for Disability Services is located in 150 Pomerene Hall, 1760 Neil Avenue; telephone 292-3307, TDD 292-0901; <http://www.ods.ohio-state.edu/>.

## TOPICS FOR PRESENTATION/DISCUSSION

For each session, the instructor will provide an overview of the topic and will engage students in discussion of relevant issues. Student participation is not only encouraged, but expected.

Week	Date	Topic
1	Jan 6	Plant biodiversity and agriculture Plants that are used by humans - brief survey
2	Jan 13	Genetic resources and agriculture: green revolution, plant breeding Centers of origins for domesticated plants What do we mean by genetic resources? How are these used? How are plants 'improved' for human use? What tools are there available to breeders? Simple traits, Quantitative (complex) traits
3	Jan 20	Genetic modification of plants: breaking biological barriers; significance for diversity
4	Jan 27	Examples of genetic resource use in plants: tomato, peanut, corn
5	Feb 3	Convention on Biological Diversity - science, society, politics, history What's the rationale for this convention? What are its benefits and drawbacks? Who owns genetic resources?
6	Feb 10	National Plant Germplasm System How the U.S. addresses the need to conserve plant diversity (germplasm)
7	Feb 17	Ex-situ (off-site) conservation - the Ornamental Plant Germplasm Center How a gene bank assembles and manages crop genetic resources Areas of research and scholarship
8	Feb 24	Seeds, plants, DNA - what to put in the bank. An overview of the nature of material that can be conserved including an assessment of advantages and disadvantages of each.
9	Mar 3	Research on germplasm: examples of specific research activities that deal with germplasm including work with corn, tomato, ornamentals, and others.
10	Mar 10	The future of gene banking: Student perspectives on plant diversity, crop genetic resources and future needs. A student-led discussion of key issues learned in the course

The instructor:

Pablo Jourdan is Associate Professor in the Department of Horticulture and Crop Science. He teaches courses in the diversity of landscape plants including trees, shrubs, vines and herbaceous plants. He is also director of the Ornamental Plant Germplasm Center that is a genebank focusing on the conservation of plants important of the landscape industry.