

Value of Variety: Agrobiodiversity

The History, Politics, & Practice of Agricultural Biodiversity Conservation

Collins LLC: L230 (30855)
Spring 2014
Time: MWF 10:10am to 11am
Location: Cravens B
N&M and Gen. Ed. – 3 credits

Instructor: Madeline Chera
Email: mchera@indiana.edu
Office Hours: MW 11am-12:30pm
and by appointment
Edmonson Formal Lounge

"Cherish variation, for without it, life will perish."

— Sir Otto Frankel, plant geneticist and expert proponent of agrobiodiversity conservation

Zea Mexicana. USDA-NRCS PLANTS Database / Hitchcock, A.S. 195.



COURSE OVERVIEW

It is estimated that 90 percent of the fruit and vegetable varieties that grew historically in the United States is now gone, and while over 7,000 apple varieties were grown globally only two centuries ago, now we most often encounter only about five, and less than one hundred are currently grown (Rural Advancement Fund International, cited in *Shattering*, by Mooney and Fowler 1990). Scientists tell us that we are in the middle of a period of dramatic loss of agricultural genetic resources, following similar trends in biological diversity more generally. The global dependence on a narrowing group of plant varieties and livestock breeds has prompted many large-scale conservation efforts aimed at maintaining agricultural diversity and documenting the local farmer knowledge that helped shape and preserve this diversity. These efforts are rooted in Western science's conceptions of biodiversity more generally, and led most notably by international organizations like the UN Food and

Agriculture Organization and Bioersity International. However, unlike other forms of biodiversity conservation, which often involve restriction of human influence on other biological life, agrobiodiversity is defined by the interaction between humans and their food over time. People are at the center of this issue, and cultural and political issues are critical to conservation.

This course will draw on resources from multiple disciplines and use examples from around the world to illustrate and explore particular concepts. We will learn basic scientific concepts, especially as they pertain to the classification of the biological world, the breeding of plants and animals, and efforts by social and biological scientists to promote conservation. This course is not lab-based, but will include lecture and activities to review these scientific concepts. We will then use our shared understandings of these concepts to consider how social, cultural, political, and economic forces shape and are influenced in turn by agricultural biodiversity. We will think about science as inextricably linked with history, philosophy, and societies, and examine agricultural biodiversity conservation from various angles, including ethnobiology and anthropology, colonial history, and international trade and law.

COURSE OBJECTIVES

In this class, we will explore the connections between conceptions of biodiversity, agricultural knowledge and practice, and international policy, considering domestic and international examples and engaging with the community and our local surroundings. We will investigate why these connections matter and how they might serve to maintain or diminish biodiversity, food security, and resource knowledge in different contexts.

After successfully completing this course, you will be able to:

- **understand and discuss** some of the events and processes in Western science that have led to contemporary understandings of biological diversity conservation, through research notebook entries and participation in class discussion.
- **think critically** about how society and science influence each other, through readings, research notebook entries, and class discussion.
- **understand, remember, and model** basic plant biology and breeding processes, taxonomic organization, and conservation techniques, through classroom practice activities, class reading, at-home tutorials, field trip participation, and completion of a comprehension quiz.
- **engage and compare** diverse types of scholarly and popular literature and media, through reading assignments, research notebook entries, film viewing, and participation in class discussion.
- **understand and analyze** the strengths and weaknesses of various conservation techniques, through readings class discussion.
- **exercise** sensorial awareness and **describe** your experiences, through a reflective tasting.
- **discuss** practical, legal, and political issues related to agrobiodiversity conservation with community members from different backgrounds, through engaged listening and participation during visits.
- **analyze and present** different viewpoints on biotechnology, through a classroom debate.
- **collect, interpret, and organize** data and literature, through creation of an annotated bibliography.
- **design** a research program, through an individualized final project, and **present** it briefly to the class.

REQUIRED READINGS

All class readings will be available digitally. Unless otherwise noted on the syllabus or in class, they will be posted on our OnCourse page.

Access our OnCourse page by going to <https://oncourse.iu.edu/portal/site/agrobiodiversity>. This should take you directly to our course tab. (If it does not, go to <https://oncourse.iu.edu/> and then navigate to our class tab.) Once on our course page, navigate to the Resources folder, where you will find a folder titled for each week of the course. If you are having trouble using and navigating OnCourse, start by looking here: <http://kb.iu.edu/data/awgc.html>.

Several of our readings come from books available through the IU Library system's ebrary account. If you would like to look at these ebooks in full, you can do so through the ebrary page by visiting <http://site.ebrary.com.ezproxy.lib.indiana.edu/lib/iub/home.action> and logging on to the IU proxy server, using your IU username and password. Alternatively, you can go to the IU Libraries page (<http://www.libraries.iu.edu/>) and search for ebrary there. Once on the ebrary site, you can search for the assigned text or related materials.

Speak with me right away if you have difficulty accessing any of these resources.

COURSE EXPECTATIONS

Assessment

The course assignments have been designed to meet the course objectives. You will complete several assignments and projects to synthesize all that you have learned as we advance through the course, to assess your progress, and in some cases, to share what you have learned with your colleagues at greater length.

- **Attendance & Participation = 100 points**

All semester

Participation and attendance is required and expected at all Collins LLC classes. We need everyone to be prepared (having done the readings) and present (physically and mentally) in our class meetings for us to benefit collectively from the intellectual work we will be doing.

However, since illnesses and other events are bound to intervene, you are allowed to miss three class meetings without losing points. You will be penalized with lost points after three unexcused absences. Preparing for class meetings and engaging in course activities will allow you to maintain points for the Attendance and Participation portion of your grade. If you are having difficulty attending and participating classes and related activities, please come and speak with me as soon as possible.

- **Research Notebook Entries = 350 points**

Due every Friday by 8am

Once every week, you will submit a short response about the readings and your reflections on the class discussions. Each week, there will be a question, series of questions, or other prompt posted on OnCourse to help you get started. The target length for each response is 300-500 words (300 minimum), and responses should be submitted through OnCourse on the Blogs tab. This will serve as your digital research notebook and fulfill several purposes for you: reminding you to prepare for class discussions, recording some of the knowledge you are building each class, and highlighting for you some of the topics and themes in which you are most interested and on which you might want to focus your final project. Entries will also help me to know what points have caught people's eyes and to provide checkpoints for early and frequent assessment and feedback. You will be allowed to skip one week, but you can always write more frequently and longer if you wish. Late submissions will be penalized 5 points per day. You can make these posts visible to others in the class, or just to me, depending on your preference.

- **Comprehension Quiz = 100 points**

Friday, 7 February 2014

This will be a short in-class quiz covering scientific concepts and terminology discussed during the first four weeks of the semester. This will serve to check whether we are all on the same page with basic ideas that are foundational to the way that agricultural biodiversity is understood today. There will be an opportunity for review and questions prior to the quiz.



MANIHOT ESCULENTA (OR CASSAVA)

- **Individualized Final Project = 250 points +200 points for checkpoints = 450 total
Due 7 May 2014, with checkpoints earlier (see below)**

Checkpoints:

- ✓ **Discuss Ideas with Instructor = 25 points**
by Monday, 31 March 2014
- ✓ **Submit Project Proposal and Objectives = 75 points**
Monday, 7 April 2014
- ✓ **Submit Annotated Bibliography = 75 points**
Monday, 21 April 2014
- ✓ **Discuss Initial Findings = 25 points**
Wednesday, 30 April 2014

This project will allow you to explore one or more aspects of the course that interest you most (or something we did not explore very much that you want to examine). You will plan this through discussion with me and base your research on literature you have collected and reviewed. You will be responsible for providing analysis of the topic, putting it in conversation with the course as a whole and the existing literature, and contributing some original finding or insight. Artistic expression and community engagement can be part of your project.

Final Grade Composition

	100 points	Attendance and Participation
	350 points	Research Notebook
	100 points	Comprehension Quiz
	+ 450 points	Final Project (including checkpoints)
	1000 points	

Grading:

A+ = 97-100%	B+ = 87-89.9%	C+ = 77-79.9%	D+ = 67-69.9%	F = below 60%
A = 93-96.9%	B = 83-86.9%	C = 73-76.9%	D = 63-66.9%	
A- = 90-92.9%	B- = 80-82.9%	C- = 70-72.9%	D- = 60-62.9%	

Plagiarism Policy

This course will adhere to Indiana University's *Code of Student Rights, Responsibilities, and Conduct*, which states:

A student must not submit work that reproduces ideas, words, or statements of another person without appropriate acknowledgment. A student must give due credit to the originality of others and acknowledge indebtedness whenever he or she does any of the following:

- a. Quotes another person's actual words, either oral or written;
- b. Paraphrases another person's words, either oral or written;
- c. Uses another person's idea, opinion, or theory; or
- d. Borrows facts, statistics, or other illustrative material, unless the information is common knowledge.

If I find that you have committed academic dishonesty on an assignment for this course, you will receive no points for the assignment, and I will report your act to the Dean of Students.

If you have any questions regarding this policy, please consult the Code at <http://www.dsa.indiana.edu/Code/index1.html>. For guidelines on how to properly attribute any material you quote, consult the MLA style guidelines available on the IU libraries' website at: <http://www.libraries.iub.edu/index.php?pageId=337>. If you need help in identifying plagiarism, you may want to take a very helpful plagiarism tutorial developed by an IU education professor at <http://www.indiana.edu/~istd/>.

Just remember, ALWAYS give credit, and try not to depend too much on quotations for your points.

Electronics Policy

Access to the Internet and digital media can be very helpful to our shared learning environment (e.g. to look something up for a group discussion) and you might also prefer to consult your readings from a digital device. For these reasons, electronics are allowed in the classroom. However, this permission is **only** on the condition that they are used as **tools** to contribute to the goals and objectives of the class. If electronics use distracts you or anyone else in the class, you will be asked to shut it off and put it away. If the distraction continues, you will lose points on your attendance and participation grade. Texting, emailing, shopping, and posting to social media during class time are unlikely to contribute to our course objectives, and are generally not allowed.

Accessibility

If you need accommodations because of disability, you must register with Disability Services for Students (DSS) and complete the appropriate forms issued by DSS, in order for accommodations to be made. The DSS office is located in Franklin Hall Room 006, and it may be reached by calling (812) 855-7578. Directions for requesting support services can also be found here: <http://studentaffairs.iub.edu/dss/2010/10/25/how-to-request-supportservices/>. Please let me know if you have any issues contacting them and working through this process.

Following DSS registration, we will work together to make sure your needs are met.

ADDITIONAL RESOURCES

In addition to checking the “News” tabs on our OnCourse page for links, articles, and reports, you can try out the Course Networking (CN) system recently added to OnCourse to see and to add posts about information relevant to our course. The course is listed as SP14 BL CLLC L230 30855 and the PIN is 5679.

And, of course, please do not hesitate to meet with me at office hours and ask for suggestions, help, and clarification on course matters.

COURSE SCHEDULE

(Readings are subject to minor changes based on needs of the students, scheduling of special activities, and other circumstances.)

	Themes	Readings	Special Activities and Deadlines
Week 1 – Introductions: to Each Other, to Biodiversity, and to Food			
M 13 Jan.	Welcome		Meeting each other and course overview
W 15 Jan.	What is biodiversity?	<ul style="list-style-type: none"> • “What is Biodiversity?” in <i>Biodiversity: An Introduction</i> by Gaston and Spicer • “The Current State of Biological Diversity” by E. O. Wilson in <i>Biodiversity</i>, ed. by E. O. Wilson 	
F 17 Jan.	Food and Biodiversity	<ul style="list-style-type: none"> • “The Plant: Corn’s Conquest,” by Michael Pollan in <i>The Omnivore’s Dilemma</i> 	
Week 2 – Historical Background: Empire, Exploration, and Classification			
M 20 Jan.		<p>NO CLASS</p> <p>Martin Luther King, Jr. Day</p> <p><i>Do something good!</i></p>	
W 22 Jan.	Empire and Economic Botany	<ul style="list-style-type: none"> • “The Science of Spices: Empiricism and Economic Botany in the Early Spanish Empire” by Paula De Vos in <i>Journal of World History</i> 	
F 24 Jan.	Organizing the World	<ul style="list-style-type: none"> • “Collecting, Classifying, and Interpreting Nature” in <i>Finding Order in Nature</i> by Paul Farber (also available on ebrary) • explore the Catalog of Botanical Illustrations at the Smithsonian National Museum of Natural History (link on OnCourse, and here: http://botany.si.edu/botart/) 	
Week 3 – Introduction to Agriculture and Breeding Basics			
M 27 Jan.	Beginnings of Agriculture	<ul style="list-style-type: none"> • “Origin of Agriculture” in <i>Evolution and the Origin of Crop Species</i> by James Hancock 	
W 29 Jan.	Breeding Basics	<ul style="list-style-type: none"> • “The Measure of Crop Diversity” by Stephen Brush in <i>Farmer’s Bounty: Locating Crop Diversity in the Contemporary World</i> (also available on ebrary) 	

F 31 Jan.	Breeding Basics	<ul style="list-style-type: none"> excerpt of “Breakthrough: Gregor Mendel” in <i>Hybrid</i> by Noel Kinsbury “Mendel’s Genetics” by Dennis O’Neill at Anthro.palomar.edu (link on OnCourse, and here: http://anthro.palomar.edu/mendel/mendel_1.htm) 	
Week 4 – Genetic Erosion and Vulnerability			
M 3 Feb.	Breeding Basics	<ul style="list-style-type: none"> “Plant Breeding” by Iqbal Hasan in <i>Agricultural Botany</i> (also available on ebrary) 	
W 5 Feb.	The State of Agrobiodiversity Loss	<ul style="list-style-type: none"> “Genetic Erosion” in <i>Shattering</i> by Cary Fowler and Pat Mooney “Food Ark” by Charles Siebert on <i>National Geographic</i> (also available at ngm.nationalgeographic.com/2011/07/food-ark/siebert-text) 	
F 7 Feb.	Disease and Pests	<ul style="list-style-type: none"> “Slouching Toward a Bananapocalypse?” by Heather Smith for <i>Grist</i> (also at grist.org/food/2011-11-11-slouching-toward-a-bananapocalypse/) 	Comprehension Quiz
Week 5 – Agrobiodiversity Conservation Emerging as Such			
M 10 Feb.	Vavilov and Centers of Diversity	<ul style="list-style-type: none"> “The Art Museum and the Seed Bank” by Gary Paul Nabhan in <i>Where Our Food Comes From</i> (also available on ebrary) 	
W 12 Feb.	Ex-Situ Conservation	<ul style="list-style-type: none"> “The Conservation of Cultivated Plants” in <i>The Conservation of Plant Biodiversity</i> by Otto Frankel, Anthony Brown, and Jeremy Burdon 	
F 14 Feb.	FAO and CGIAR	<ul style="list-style-type: none"> “The CGIAR at 40” Summary (skim) 	Mini-Field Trip to the IU Herbarium
Week 6 – Institutional Conservation and Breeding			
M 17 Feb.	Agricultural Research Centers	<ul style="list-style-type: none"> “Preface” from <i>Biodiversity in Trust</i> edited by Fucillo, Sears, and Stapleton “Research Centers” at CGIAR website (link on OnCourse and here: www.cgiar.org/cgiar-consortium/research-centers/) “Science and Storytelling” interview by FutureEarth blog (text on OnCourse, and at www.futureearth.info/2013-nov-21/science-and-storytelling) 	
W 19 Feb.	Green Revolution	<ul style="list-style-type: none"> excerpt from “The Green Revolution” in <i>Future of Genetically Modified Crops: Lessons from the Green Revolution</i> by Felicia Wu and William Butz (also available on ebrary) 	

		<ul style="list-style-type: none"> • “Lessons from the Green Revolution” by Peter Rosset from FoodFirst! 	
F 21 Feb.	<i>In-Situ</i> Conservation	<ul style="list-style-type: none"> • excerpt from “Maintaining Crop Diversity On-Farm and Off” in <i>Farmers’ Bounty</i> by Stephen S. Brush 	
Week 7 – The Cultural Significance of Agrobiodiversity and Farmer Selection			
M 24 Feb.	Culture and Agriculture	<ul style="list-style-type: none"> • “‘The Friendly Potato’: Farmer Selection of Potato Varieties for Multiple Uses,” by Gordon Prain, Fulgencio Uribe, and Urs Scheidegger in <i>Diversity, Farmer Knowledge, and Sustainability</i> 	
W 26 Feb.	Cultural Memory and Identity	<ul style="list-style-type: none"> • “A Spirit Earthly Enough: Locally Adapted Crops and Persistent Cultures” by Gary Paul Nabhan in <i>Enduring Seeds</i> 	
F 28 Feb.	Farmers’ Choices	<ul style="list-style-type: none"> • “Threatened Pockets of Memories” by Virginia Nazarea in <i>Cultural Memory and Biodiversity</i> • “Connecting with Community Key for Organic Farmers” by Erica Quinlan from <i>Indiana AgriNews</i> 	
Week 8 – Indigenous Knowledge and Ethnoecology			
M 3 Mar.	Local Knowledge and Conservation	<ul style="list-style-type: none"> • “Apple-achia” by James Veteto and “Nancy Hall, Respected Elder Boards the Ark” by Doug Elliot in <i>Place-Based Food Traditions of Appalachia</i> by Renewing Americas Food Traditions 	
W 5 Mar.	Ethnoecology and “Folk Taxonomy”	<ul style="list-style-type: none"> • “Definitions, Concepts, and Methods in the Ethnobotany of Food Plants” by Attila Szabó in <i>Researching food habits: methods and problems</i> edited by Helen Macbeth and Jeremy MacClancy 	
F 7 Mar.	Ethnoecology Methods	<ul style="list-style-type: none"> • “What Works in the Field? A Comparison of Different Interviewing Methods in Ethnobotany with Special Reference to the Use of Photographs” by Thomas, Vandebroek, and Van Damme in <i>Economic Botany</i> 	
Week 9 – Aesthetics of Agrobiodiversity			
M 10 Mar.	Slow Food	<ul style="list-style-type: none"> • excerpt from “The Noah Principle” in <i>Slow Food: A Case for Taste</i> by Carlo Petrini • Slow Food Manifesto (link on Oncourse and at www.slowfood.com/about_us/eng/manifesto.lasso) • “The Pleasure of Diversity in Slow Food's Ethics of Taste” by Kelly Donati in <i>Food, Culture, and Society</i> 	
W 12 Mar.	Pleasure and Taste	<ul style="list-style-type: none"> • “Lost Foods Reclaimed” by Rick Nichols in <i>Best Food Writing 2008</i> edited by Holly Hughes • excerpt from <i>To the Origins of Taste</i> booklet by Slow 	Introduce final project

		Food	Taste Testing
F 14 Mar.	Farmers’ Efforts in the U.S.	<ul style="list-style-type: none"> • “A Garden of Earthly Delights” from <i>Melons for the Passionate Grower</i> by Amy Goldman • look through The Seed-Savers Exchange 2014 catalog (http://read.timesprintingdigital.com/t/26979) 	Q&A with a local farmer
SPRING BREAK – 15 March through 23 March 2013			
Week 10 – International Policy			
M 24 Mar.	Intellectual Property Rights & Biopiracy	<ul style="list-style-type: none"> • “Farming, Food and Global Rules” by Geoff Tansey in <i>The Future Control of Food</i>, edited by Tansey and Rajotte (also available on ebrary) 	
W 26 Mar.	Plant Variety Protection Regimes	<ul style="list-style-type: none"> • excerpt from “The Convention for the Protection of New Varieties of Plants and the UPOV System” in <i>Agrobiodiversity and the Law: Regulating Genetic Resources, Food Security and Cultural Diversity</i> by Juliana Santilli 	
F 28 Mar.	Plant Variety Protection Regimes	<ul style="list-style-type: none"> • excerpt from “Technological change and the design of plant variety protection regimes” by Mark Janis and Stephen Smith in <i>Chicago-Kent Law Review</i> 	Speaker: Prof. Janis from Law School
Week 11 - Biotechnology			
M 31 Mar.	New Techniques in Breeding	<ul style="list-style-type: none"> • “The Tools of Genetic Engineering” by Pamela C. Ronald in <i>Tomorrow’s Table</i> by Pamela C. Ronald and Raoul W. Adamchak • “Farmer’s Supreme Court Challenge Puts Monsanto Patents at Risk” by Andrew Pollack in <i>The New York Times</i> 	Deadline to Discuss Ideas for Project with Instructor
W 2 Apr.	Precautionary Principle, Politics, and Principles for Assessing an Argument	<ul style="list-style-type: none"> • “Genetic Engineering: Do the differences make a difference?” by Nathanael Johnson on Grist (also at http://grist.org/food/genetic-engineering-do-the-differences-make-a-difference/) • selections from “Genetically Engineered Plants and Foods: A Scientist’s Analysis of the Issues” (Parts I and 2) by Peggy Lemaux in <i>Annual Review of Plant Biology</i> 	
F 4 Apr.	Genetically Modified Organisms	<ul style="list-style-type: none"> • selections from “Genetically Engineered Plants and Foods: A Scientist’s Analysis of the Issues” (Parts I and 2) by Peggy Lemaux in <i>Annual Review of Plant Biology</i> 	Informal Debate

Week 12 – Agroecology and Community-Based Conservation			
M 7 Apr.	Seed-Saving and Exchange	<ul style="list-style-type: none"> excerpt from “Seed Exchange Networks for Agrobiodiversity Conservation: A Review” by Marco Pautasso, Guntra Aistara, Adeline Barnaud, et al. in <i>Agronomy for Sustainable Development</i> 	Submit project proposal
W 9 Apr.	Homegardens and Forest Management	<ul style="list-style-type: none"> “A Treasury of Genetic Resources is Maintained in Gardens” in <i>Gardens of Biodiversity</i> by the FAO 	
F 11 Apr.	Food Sovereignty, Farmers’ Rights	<ul style="list-style-type: none"> “From Food Sovereignty to Peasants’ Rights: an Overview of Via Campesina’s Struggle for New Human Rights” by Priscilla Claeys for La Via Campesina 	Film viewing (at home) NO class meeting
Week 13 – Dietary Diversity and Nutrition			
M 14 Apr.	Framing Hunger	<ul style="list-style-type: none"> “Genetically modified crops and the ‘food crisis’: discourse and material impacts” by Glenn Davis Stone & Dominic Glover in <i>Development in Practice</i> 	
W 16 Apr.	Agrobio- diversity and Nutrition Indicators	<ul style="list-style-type: none"> “Linking Biodiversity, Diet and Health in Policy and Practice” by Timothy Johns and Pablo B Eyzaguirre in <i>Proceedings of the Nutrition Society</i> 65(02):182–189 	
F 18 Apr.	Nutritional, Culinary, and Agricultural Knowledge	<ul style="list-style-type: none"> “The Maasai food system and food and nutrition security” by Shadrack Oiyie, et al. in <i>Indigenous People’s Food Systems</i>, ed. by Barbara Kuhnlein, et al. 	
Week 14 – Agrobiodiversity and Economics			
M 21 Apr.	Incentives	<ul style="list-style-type: none"> “Does Crop Diversification Pay Off? An Empirical Study in Home Gardens of the Iberian Peninsula” by Reyes-Garcia et al. in <i>Society and Natural Resources</i> 	Submit annotated bibliography
W 23 Apr.	Value Chains	<ul style="list-style-type: none"> “Commercialization and Market Linkages for Promoting the Use of Local Rice Varieties” by J. Guatam and Krishna Pant in <i>The Economics of Managing Crop Diversity On-farm</i> edited by Edilegnaw Wale (also available on ebrary) 	
F 25 Apr.	Rural Resilience	<ul style="list-style-type: none"> “Community biodiversity management: Promoting resilience” by Walter Simon de Boef, Marja Thijssen, Nivaldo Peroni, and Abishkar Subedi in <i>Community Biodiversity Management</i> edited by de Boef et al. (also available on ebrary) 	
Week 15 – Looking Forward: Other Issues in Agrobiodiversity Conservation			

M 28 Apr.	Climate Change and New Strategies	<ul style="list-style-type: none"> • “What is Vulnerable?” by Hallie Eakin in <i>Food Security and Global Environmental Change</i> edited by John Ingram, Polly Ericksen, and Diana Liverman • “Now This is Natural Food” by Mark Bittman in <i>The New York Times</i> 	
W 30 Apr.	Big Data, Open Access	<ul style="list-style-type: none"> • “Data standards; making CGIAR data available and accessible” from CGIAR 	Share Initial Findings of Final Project
F 2 May	Diversity in the Margins	<ul style="list-style-type: none"> • “Conservation Without Design: Or, the Anthropology of Quirkiness” by Virginia Nazarea in <i>Heirloom Seeds and Their Keepers</i> 	Instructor Assessments Celebratory Brunch
Exam Period: Final project due Monday, 7 May 2014, 7PM.			