Food Crop Diversity: Evolution, Conservation and Use

Environmental Studies 158
Fall 2014, M & W 12:30 – 1:45, Phelps Room 1425, UC Santa Barbara

Instructor: Dr Daniela Soleri, soleri@geog.ucsb.edu; Room 4003 Bren, floor 4L; Office hours: M 2:30-4:30, and by appointment

course web site: GauchoSpace

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1. **Introduction**

Virtually all people on earth rely on the plants that are our food crops. Food crops comprise the majority of our diet and nutrients—82 and 61% of energy and protein respectively at the global level; many of them have been repurposed to fuel the growing demand for meat and dairy in global diets; growing food crops on small farms provides the livelihoods for about 0.7 billion people, most of them in the Third World; growing and processing these crops has changed ecological, social and political environments.

Food crops are a critical resource for survival, but in addition to their fundamental contribution to human diet and nutrition, food crops are an important aspect of who we are, and a major influence on how we interact with each other and our environment. Food crops represent the fascinating, often complex interaction of plant biology, environment and human knowledge and practice. The diversity between and within these crops affects this interaction and all of the roles those plants play in human life.

In this class we will take a broad, though not superficial look at diversity in food crops including how that diversity originated, how it can be defined and measured, processes by which it changes, where and how it is conserved, its significance and utility, or lack thereof today and for the future. We will take an interdisciplinary perspective, considering both biological and sociocultural aspects of food crop diversity (FCD) with an emphasis on how human knowledge and practice affect the basic genetic diversity and processes shaping the FCD we depend on. The goals of this class are to a) introduce you to FCD, its function and significance, b) enable you to look critically at contemporary processes affecting and using FCD so you can contribute to informed discussions and decisions related to that diversity, and c) increase your awareness of FCD in your own life, both proximal—How much FCD do you eat?—and distal—Could FCD affect our global capacity to respond to climate change? Whenever possible we will consider these topics in the context of California, Santa Barbara, and your life.

The class will include critical readings of recent peer reviewed scientific papers, class lectures and discussions, quizzes, an exam and assignments. Those assignments are mini fieldwork projects both actual and virtual, and personal data collection. These are designed to enrich and enliven your academic learning by getting you personally engaged with FCD in your life and environment. In addition, three field trips and three Skyped-in guest speakers will allow you to hear about and discuss FCD with professionals working directly with it.

Prerequisite: upper division or graduate standing.

2. **Requirements**

Please read this syllabus VERY CAREFULLY. By taking this course you agree to the requirements and terms stated here. These requirements may be modified or supplemented later in minor ways, and you are responsible for those changes.

This course uses GaucSpace (GS), where you will find this syllabus, class announcements and assignments and the required readings. Every Thursday by 11 PM the study questions for the following week will be posted under the GS ‘section’ for the appropriate week.
In addition, all of the assignments will be posted in an assignment section at the top of the ES 158 GS homepage, just under the class header and link to the syllabus. By clicking on the assignment link you will find instructions, due date, and interactive pdf forms to be used for that assignment. All written assignments are to be uploaded to the appropriate assignment by the date and time they are due. Assignments uploaded after the time and date due will be considered a day late. See section 2.4 of this syllabus for detailed explanation.

Quizzes and the exam will not be given early, and makeups only given in cases of well and appropriately documented emergencies.

All three field trips (20 Oct, 3 Nov, 3 Dec) will be done during class time. The December 3rd trip could extend a bit longer, but we will discuss this. In addition, there are four short projects designed to encourage you to become familiar with food crop diversity in your own life, the Santa Barbara area, and on the internet.

Be sure to check your academic, athletic, social and any other schedules you have to ensure there are no conflicts with this class, including the final schedule, and that you do not have too many finals on the same date. The final for ES 158 is on Tuesday December 16th 12-3 PM. If conflicts exist it is your responsibility to take care of them so that you may take the exam Tuesday Dec 16th 12-3 PM, or drop the class.

Being responsible for your own learning is key for a rewarding University and life experience. If you have difficulty understanding the material in this course, please discuss this immediately with the instructor. Ask thoughtful questions during and after class, email me, come to office hours, talk with your peers.

In addition, there is a wide range of services available at UCSB to support you in your efforts to meet the course requirements and acquire an education overall. The UCSB Office of Student Affairs provides the following information:

- **LEARNING ASSISTANCE & SUPPORT.** Campus Learning Assistance Service: (893.3269, www.clas.ucsb.edu). CLAS helps students increase their mastery of course material through course-specific tutoring and academic skills development. Check out the tutorial groups and drop-in tutoring schedules posted on the web site: Sign up for services at the CLAS main office, SRB 3210 8-5 daily, closed noon-1pm for lunch.
- **STRESS MANAGEMENT, PSYCHOLOGICAL SUPPORT, IV TRAGEDY RECOVERY.** Counseling & Psychological Services (CAPS) (893-4411, http://counseling.sa.ucsb.edu/) Personal concerns such as stress, anxiety, relationships, depression, cultural differences, can interfere with the ability of students to succeed and thrive. CAPS offers counseling for personal & career concerns, self-help information and connections to off-campus mental health resources.
- **DISABILITY SUPPORT.** Disabled Students Program: (893.2668, http://dsp.sa.ucsb.edu/) DSP provides academic support services to eligible students with temporary and permanent disabilities. Please let us know if you require special classroom accommodations due to a disability. You must register with DSP prior to receiving these accommodations. Students with disabilities may request academic accommodations for exams online at the UCSB Disabled Students Program website. Please make your requests for exam accommodations through the online system as early in the quarter as possible to ensure arrangement.
- **RESPONSIBLE SCHOLARSHIP, ACADEMIC INTEGRITY, APPROPRIATE CONDUCT.** UCSB Office of Judicial Affairs (893.4569, http://judicialaffairs.sa.ucsb.edu). Honesty and integrity in all academic work is essential for a valuable educational experience. The Office of Judicial Affairs has policies, tips, and resources for proper citation use, recognizing actions considered to be cheating or other forms of academic theft, and students’ responsibilities and conduct, available on their website. Students are responsible for educating themselves on the policies and to abide by them. Also available for download at this website is the UCSB Student Code of Conduct.
- **INTERNATIONAL STUDENTS.** Office of International Students and Scholars (893.2929 http://www.oiss.ucsb.edu/) serves the needs of international students and scholars as well as the UCSB community who work with this international population.
2.1. Comportment

Comportment (komˈpɔrtmant): the way or manner in which one conducts oneself; personal bearing or conduct; demeanor; behavior.

Interactions with others EVERYONE, in all interactions associated with this class both in person and online, in class or on field trips, is expected to comport themselves in a manner demonstrating sincere mutual respect, tolerance, a sense of equity, patience, courtesy and compassion. One of the most difficult and most essential tasks that all humans have is to develop our capacities for empathy and cooperation; university classes are an excellent place to practice and strengthen those skills.

Electronics No electronics (phones, music devices, tablets, computers, etc) may be used in this class and all must be shut down and stowed during class time. Notes may be taken by hand and later transcribed to computer if that is your preference. If you have documentation from DSP stating that you require a devise please see me.

Field trips, guest speakers All guest speakers, either via Skype or on a field trip are accomplished professionals who have agreed to take time to enrich your learning experience. You are expected to listen and ask questions with respect, courtesy and patience. It is unacceptable comportment to sit or stand apart from the group and talk among yourselves, and to arrive late and/or leave early. Just as in regular class sessions, all electronics must be off and stowed during field trips or Skype sessions.

Academic integrity In this class there is a zero tolerance toward plagiarism, cheating, unauthorized ‘sharing’ of class information, etc. Such conduct deprives you and your peers of learning opportunities and is antithetical to the idea of a fair and respectful learning environment. Any violations will be referred to the UCSB Office of Judicial Affairs and other appropriate campus authorities.

Regarding use of any course material for profit, i.e., Study Soup, Course Hero, etc. All course materials (class lectures and discussions, handouts, examinations, web materials) and the intellectual content of the course itself are protected by United States Federal Copyright Law, the California Civil Code. The UC Policy 102.23 expressly prohibits students (and all other persons) from recording lectures or discussions and from distributing or selling lectures notes and all other course materials without the prior written permission of the instructor (http://policy.ucop.edu/doc/2710530/PACAOS-100). Students are permitted to make notes solely for their own private educational use. Exceptions to accommodate students with disabilities may be granted with appropriate documentation. To be clear, in this class students are forbidden from completing study guides and selling them to any person or organization. (This text has been approved by UC General Counsel.)

2.2. Computer & internet access and competency

Access to and use of the internet for this class is required. You will need to check updated weekly assignments posted on the class website, and the readings are available only on the internet. You are responsible for checking the website to stay up to date, i.e. several times every week. Each student is also required to have an active email account that they check daily, so that it can be used for communication with the instructor, and with other students. There are computers in the Environmental Studies Conference Room, Bren 4016, floor 4L.

2.3. Lectures and readings

In the syllabus readings are listed on the date they will be discussed. Lectures will be based on the assumption that you have completed the required readings and other assignments for that date. Study questions on each week’s readings will be available on the class Gauchospace by 11 PM on Thursday of the week before we will be discussing the reading assignment. In answering the study questions you will be guided to the parts of the readings that
require the most thought and attention. Study questions are for your benefit; they are not ‘turned in’ or graded, they are the basis of most quiz and exam questions.

By 11 PM Thursday night the lectures of the preceding Mon & Wed will be posted to GS. These will not be the entire lecture, i.e., you cannot skip class and just look at online powerpoints.

All required readings for this course are posted on the course web site as PDF files. Almost all of the readings are chosen from the peer reviewed literature, i.e. they are not popular summaries. For ease and clarity the ES 158 GS is organized into weeks with dates and class numbers indicated. The PDF files of readings are located in the appropriate week ‘block’ on the website. PLEASE NOTE: IT IS VERY POSSIBLE THAT SOME READINGS WILL BE CHANGED DURING THE COURSE OF THE QUARTER. ANY CHANGES WILL BE ANNOUNCED IN CLASS AND A NOTICE AND NEW PDF FILE POSTED UNDER THE APPROPRIATE WEEK.

2.4. Assignments

There are a total of five assignments for this class, in addition to class attendance & participation, quizzes, and the final exam. For each assignment, all written material needs to be submitted online through the class GauchoSpace website by a specified date and time. All assignments will be marked down one letter grade for every 24 hours they are late. As a hypothetical example, you have done an assignment that is due Tuesday December 2nd by 11 PM. Let’s say that if you upload it by that time and date your grade would have been a B+. You forget to upload it until 10:45 AM on December 3rd; your grade will then be a C+.

To receive credit for uploaded assignments follow this protocol for file naming: “assignment1_yourlastname-yourfirstinitial.ext”; for example Annie Lopez would submit her introductory essay as “assignment1_Lopez-A.docx”. ***THE ONE EXCEPTION TO THIS IS ASSIGNMENT #2 CROP OF THE DAY ➔ follow the file naming protocol outlined under the instructions for that assignment.***

Provide references for information in your assignments that you do not collect in person. Provide either the complete URL for a website or, if from a written publication provide the complete reference following the format used for readings listed in this syllabus. For example:


Incomplete references will result in a loss of points on the assignment.

Failing to follow any of these instructions will result in a loss of points.

Assignment #1 Introductory essay

3 points/question, 30 points total.

Goal: Introduce yourself and your interest in this class.

Due: Upload to ES 158 GS assignment #1 folder by 10 AM Wednesday, October 8th; follow file naming protocol described above.

Equivalent of 1-2 pages long, answer the following questions in sections numbered 1-10, saved as MS Word or pdf file.

1. Your name, year, major.
2. Why are you taking this course?
3. What are your definitions of agriculture, food crops, food crop diversity, and plant breeding?
4. What is your experience with agriculture, food crops, food crop genetic diversity, and plant breeding?
5. What to you are the most a) personally interesting, and b) globally important aspects of food crop diversity?
6. What do you expect to get out of this course?
7. Specifically, how do you hope to apply what you learn in ES 158 in the future?
8. What grade do you expect to receive in ES 158 and why?
9. What related courses have you taken at UCSB and elsewhere?
10. Have you read the syllabus for ES 158?

Assignment #2 Crop of the day
Total points 120 = [presentation=40] + [uploaded form=80].
Goal: Using internet resources, learn important basic information about a food crop, make available online and give a brief presentation to the class.
Due: Powerpoint presentation given to instructor at start of class on date assigned; final powerpoint and completed crop of the day form uploaded to ES 158 GS assignment #2 folder by 11 PM the day you give your presentation in class
Methods:
a) Choose a food crop species and a presentation date and have both of these approved by the instructor BEFORE completing the assignment. **Spaces are limited and given on a first come, first served basis**
b) Investigate this crop so that you may complete the assignment form including sources of information.
c) Provide images as requested, copied and pasted into the form under the appropriate questions. Be sure your final completed form retains the formatting laid out in the original form.
d) Reproduce your completed online form and images as a short Powerpoint presentation, bring this to class on your assigned date ON A MEMORY STICK, give this to the instructor by or before 12:30 PM that day.
e) Using your Powerpoint images, give a brief (3 minutes!) summary presentation in class on that assigned date.
   These presentations will be timed and your grade will include consideration of your success in giving an informative, interesting presentation in the time allotted.
f) Save your final completed form as a pdf file and your Powerpoint presentation using the common name of your crop for as the basis of all file names. For example, if your crop was maize you would have two files to upload: maize.pptx, maize.pdf. Upload your files to the ES 158 GS assignment #2 folder by 11 PM on the day you give your presentation. This will remain available to your classmates through the end of the quarter.

Assignment #3 SB diversity indices practice
Estimating food crop diversity in gardens and at the county level. 70 points total, 11 points/calculation, 4 free!
Goal: Practice using the common indices of food crop diversity with examples from the IV Community Garden, and 2013 SB county-level data.
Due: Upload the SB diversity indices assignment form to the ES 158 GS assignment #3 folder by 11 PM on Tuesday November 11th; follow file naming protocol described above.
Methods:
a) Use data we collect on our field trip the IV Community Garden on Monday November 3rd (you must participate in the field trip to do this assignment), and the SB County 2013 Crop Report posted in the ES158 assignment #3 folder on GS.
b) Download index_calculator.xlsx, in the ES158 assignment #3 folder on GS.
c) Using the calculator estimate the following for crop species in 4 IVCG garden plots identified by plot number (Jarvis et al. 2008) [IVCG sheet in spreadsheet]: i) richness for pooled data from those plots; ii) eveness for pooled data from those plots, using the complement of Simpson’s D; iii) the divergence for those garden data.
d) Using the calculator estimate the following for crop species in SB county using the 2013 crop report data [SBC sheet in spreadsheet]: i) richness for pooled vegetable, fruit & nut data; ii) eveness for pooled vegetable, fruit & nut data, using the complement of Simpson’s D, i.e. 1-D; iii) eveness for pooled vegetable, fruit & nut data, using Pielou’s index (Bonneuil et al. 2012).
e) Save the index calculator file using the usual assignment naming protocol and upload to ES158 assignment #3 folder on GS before 11 PM on Tuesday November 11th.

Assignment #4 Market diversity
Inter- and intraspecific food crop diversity at your Farmers Market. 30 pts total, 1.5 pts ea, 3 pts free + extra credit.
Goal: Increase your awareness and recognition of locally grown food crop diversity.
Due: Upload the Farmers Market assignment form to the ES 158 GS assignment #4 folder by 11 PM on Tuesday November 18th; follow file naming protocol described above.

Methods:

a) Visit one of the certified Farmers Markets in the Santa Barbara area. See http://www.sbfarmersmarket.org/events.php for times and locations, there is one everyday except Monday in the region.

b) Document three different food crop species being sold, including the name(s) of the i) crop and ii) the variety being sold, and for each, iii) the name of the farm selling them.

c) For a fourth food crop species NOT included in (b) above, document three different varieties of that species being sold, including the name of the i) crop (common and Latin), ii) the names of the varieties being sold—likely you will need to ask, and iii) for each variety, the name of the farm selling them. Using complete sentences or clear bulleted lists, describe what for you are the most noticeable phenotypic differences between these three varieties.

d) Use this information to complete the Farmers Market assignment form.

e) Save and upload this form to the ES 158 GS assignment #4 folder by 11 PM on Tuesday November 18th.

f) 10 points of extra credit are available on this assignment—see form.

Assignment #5 Harvest feast
Harvest Feast 2014: Food crop diversity: its origin and meaning at your 2014 harvest feast (150 points total).

Goal: Document food crop diversity, and its origins, traditionally associated with a harvest feast, as well as newer additions, the reason for those additions and their significance to you.
Due: Upload the Harvest Feast form to the ES 158 GS assignment #5 folder by 11 PM on Tuesday December 2nd, follow file naming protocol described above.

Methods:

a) At your holiday meal, or if you do not celebrate the harvest feast of Thanksgiving, a major meal you have over that holiday break, make a complete list of each dish you are eating.

b) Identify which of all the dishes on your complete harvest feast menu you consider to be part of i) the stereotypical US Thanksgiving menu and ii) which of your dishes are not a part of that list, but are new or old traditions of your family or close social group; we’ll call these personal traditions. For example, we could say stereotypical dishes (i) are cranberry sauce, rice stuffing with herbs and chestnuts, apple pie and pumpkin pie. Examples of personal traditions (ii) might include couscous with harvest vegetable tagine, spicy peanut sauce, bao with spiced sweet squash filling, turkey tamales.

c) If you have no holiday meal over the Nov 27th – 30th break you may look here http://www.dmoz.org/Home/Cooking/Holidays/Thanksgiving/ for links to recipes and foods typical of Thanksgiving observance in the US. Use this as your source for ‘stereotypical’ dishes.

d) Choose a minimum of FOUR (4) dishes for which you will complete steps (e) through (g). You must have at least one dish from the stereotypical and one dish from the personal traditions categories.

e) For each dish identified in step (d), make a thorough list of plant ingredients used in the preparation of that. For example, crops used in making pumpkin pie; crops used in making stuffing, etc. Don’t forget herbs, spices, stabilizers, thickeners, colorants, etc!

f) Document the Latin name using proper formatting, and center of domestication (COD) of each of the crops in each of the dishes, providing references for all information.

g) Reflect on your findings (~500 words). Do the crops in stereotypical dishes make sense as ingredients in a local harvest feast in early 17th century NE North America? Why or why not? Why are the personal traditions a part of your own harvest feast today, how did they get onto your menu? What is different about these—is it the dishes themselves? The ingredients used? Both? Do these personal traditions have any special meaning or associations for you? If so, explain.

h) Upload your completed assignment form to the ES 158 GS assignment #5 folder by 11 PM on Tuesday December 2nd
2.5. Quizzes and final exam

Quiz and exam questions will be a mixture of objective questions (multiple choice, matching, completion), and short essay, and will be based on the study questions, lectures, discussions, films, field trips. The best way to prepare is by asking questions and participating in discussion during class, taking notes on the lectures, films, field trips, class discussions, and readings, and writing out answers to all of the study questions before each class.

Quizzes and the exam are cumulative. This means that a quiz can include all material covered up to, but not on, the day that quiz is given. The final exam will cover all material in the course. Grades from only the best two out of the three quizzes will be kept.

3. Student evaluation

Your course grade will be the sum of your grades for the five assignments, your two best quizzes, and the final exam. Evaluation will be based on your comprehension and analysis of all course material (assigned readings, films, lectures, field trips and discussion), and how you convey these in the work you do for this class.

Attendance in all class sessions is required. If you cannot attend you are still responsible for the material covered. You will receive a “0” for any test or assignment you miss, late assignments receive reduced grades. The only exception will be for appropriately documented emergencies. A letter or email sent directly to the instructor from a physician stating that you were in a bicycle accident and in the emergency room at the time of the class is appropriate; an email from your intermural coach saying you were playing in a game is not acceptable. Assignments are due at or before the date and time given on the syllabus; be sure to check the ES 158 GS website should there be a change. Assignments submitted after the designated due date and time will be dropped a grade for every 24 hours they are late. See section 2.4 Assignments.
3.1. Schedule and point distribution

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>DATE</th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (best 2 of 3) 150 each</td>
<td>Wednesday October 22nd, class #6</td>
<td>300</td>
</tr>
<tr>
<td>(1) : material through class #5</td>
<td>Monday November 12th, class #12</td>
<td></td>
</tr>
<tr>
<td>(2) : material through class #11</td>
<td>Monday December 1st, class #17</td>
<td></td>
</tr>
<tr>
<td>Final exam</td>
<td>Tuesday December 16th, 12:30 PM</td>
<td>300</td>
</tr>
<tr>
<td>Assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>#1 Introductory essay</td>
<td>Wednesday October 8th, uploaded by 10 AM</td>
<td>30</td>
</tr>
<tr>
<td>#2 Crop of the day form + presentation (3 minutes each, 1 per student)</td>
<td>Wks 3-10, Presentation [40 pts] on assigned date, Form [80 pts] uploaded by 11 PM, presentation day</td>
<td>120</td>
</tr>
<tr>
<td>#3 Diversity indices</td>
<td>Tuesday Nov 11th, uploaded by 11 PM</td>
<td>70</td>
</tr>
<tr>
<td>#4 Market diversity</td>
<td>Sunday Nov 3rd, uploaded by 11 PM</td>
<td>30</td>
</tr>
<tr>
<td>#5 Harvest feast</td>
<td>Tuesday Dec 2nd, uploaded by 11 PM</td>
<td>150</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>1000</td>
</tr>
</tbody>
</table>

3.2. Grading system

Your grade will be a result of your work and improvement during the course. Grading is not on curve. All students can earn an “A,” or an “F.”

<table>
<thead>
<tr>
<th>POINTS EARNED</th>
<th>GRADE</th>
</tr>
</thead>
<tbody>
<tr>
<td>967-1000</td>
<td>A+</td>
</tr>
<tr>
<td>933-966</td>
<td>A</td>
</tr>
<tr>
<td>900-932</td>
<td>A-</td>
</tr>
<tr>
<td>867-899</td>
<td>B+</td>
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<tr>
<td>833-866</td>
<td>B</td>
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<tr>
<td>800-832</td>
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<tr>
<td>600-632</td>
<td>D-</td>
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<tr>
<td>0.599</td>
<td>F</td>
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## 4. Schedule at a glance

<table>
<thead>
<tr>
<th>Date</th>
<th>WK</th>
<th>Day</th>
<th>Class</th>
<th>Crosscutting idea</th>
<th>Topic</th>
<th>Assignment due/testing</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-Oct</td>
<td>1</td>
<td>M</td>
<td>1</td>
<td>Sources of genetic diversity of food crops &amp; processes shaping it</td>
<td>Introduction to FCD, orientation, sources of genetic diversity &amp; processes</td>
<td>Assignment #2, crops of the day (COD) ongoing as assigned, start class #6</td>
</tr>
<tr>
<td>8-Oct</td>
<td>W</td>
<td>2</td>
<td></td>
<td>No class!!!</td>
<td>SQ1 &amp; 2</td>
<td>DUE: assignment #1, introductory essay uploaded Wednesday Oct 8th by 10 AM</td>
</tr>
<tr>
<td>13-Oct</td>
<td>2</td>
<td>M</td>
<td>3</td>
<td>Genetic diversity &amp; processes, cont. individual and population</td>
<td>COD: maize</td>
<td></td>
</tr>
<tr>
<td>15-Oct</td>
<td>W</td>
<td>4</td>
<td></td>
<td>How did people interact with food plants before domestication?</td>
<td>COD: cacao</td>
<td></td>
</tr>
<tr>
<td>20-Oct</td>
<td>3</td>
<td>M</td>
<td>5</td>
<td>FIELD TRIP :: Predomestication in your backyard. CCBER nursery, guest speaker</td>
<td>FIELD TRIP :: Predomestication in your backyard. CCBER nursery, guest speaker</td>
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<td></td>
<td>CCBER nursery manager Wayne Chapman.</td>
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<td></td>
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<tr>
<td>22-Oct</td>
<td>W</td>
<td>6</td>
<td></td>
<td>What is food plant domestication and how did it occur?</td>
<td>Quiz #1, material through class #5</td>
<td>COD x 3</td>
</tr>
<tr>
<td>27-Oct</td>
<td>4</td>
<td>M</td>
<td>7</td>
<td>Food plant domestication, cont.</td>
<td>COD x 4</td>
<td></td>
</tr>
<tr>
<td>29-Oct</td>
<td>W</td>
<td>8</td>
<td></td>
<td>Divergence between formal and informal FCD systems</td>
<td>COD x 4</td>
<td></td>
</tr>
<tr>
<td>3-Nov</td>
<td>5</td>
<td>M</td>
<td>9</td>
<td>FIELD TRIP :: IV Community Garden</td>
<td>Data for calculation of assignment #3</td>
<td></td>
</tr>
<tr>
<td>5-Nov</td>
<td>W</td>
<td>10</td>
<td></td>
<td>What is the conventional approach to conserving FCD?</td>
<td>COD x 4</td>
<td></td>
</tr>
<tr>
<td>10-Nov</td>
<td>6</td>
<td>M</td>
<td>11</td>
<td>Alternatives: Strategies for reclaiming and using FCD</td>
<td>Assignment #3: Diversity indices uploaded by 11 PM Tue Nov 11th</td>
<td>DUE: Assignment #3: Diversity indices uploaded by 11 PM Tue Nov 11th</td>
</tr>
<tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>COD x 2</td>
<td></td>
</tr>
<tr>
<td>12-Nov</td>
<td>W</td>
<td>12</td>
<td></td>
<td>How do farmers and formal plant breeders use FCD for crop improvement?</td>
<td>Quiz #2, material through class #11</td>
<td>COD x 3</td>
</tr>
<tr>
<td>17-Nov</td>
<td>7</td>
<td>M</td>
<td>13</td>
<td>What are new approaches to using FCD in crop improvement?</td>
<td>DUE: Assignment #4: market diversity uploaded by 11 PM Tue Nov 18th</td>
<td>COD x 4</td>
</tr>
<tr>
<td>19-Nov</td>
<td>W</td>
<td>14</td>
<td></td>
<td>Do seed systems matter?</td>
<td>COD x 4</td>
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<tr>
<td>24-Nov</td>
<td>8</td>
<td>M</td>
<td>15</td>
<td>Alternative seed system strategies; Guest speaker via skype David King, Seed Library</td>
<td>Alternative seed system strategies; Guest speaker via skype David King, Seed Library of</td>
<td>COD x 2</td>
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<td>of Los Angeles</td>
<td>Los Angeles</td>
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<tr>
<td>26-Nov</td>
<td>W</td>
<td>16</td>
<td></td>
<td>Can FCD be agronomically useful?</td>
<td>COD x 4</td>
<td></td>
</tr>
<tr>
<td>1-Dec</td>
<td>9</td>
<td>M</td>
<td>17</td>
<td>Can FCD help us respond to change?</td>
<td>Quiz #3, material through class #16</td>
<td>DUE: Assignment #5; Harvest feast uploaded by 11 PM Tue Dec 2nd</td>
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<tr>
<td>3-Dec</td>
<td>W</td>
<td>18</td>
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<td>FIELD TRIP :: Goodland Organics. Jay Ruskey, farmer/owner</td>
<td>FIELD TRIP :: Goodland Organics. Jay Ruskey, farmer/owner</td>
<td>DUE: Assignment #5; Harvest feast uploaded by 11 PM Tue Dec 2nd</td>
</tr>
<tr>
<td>8-Dec</td>
<td>10</td>
<td>M</td>
<td>19</td>
<td>Do cuisine and identity affect FCD?</td>
<td>DUE: Assignment #5; Harvest feast uploaded by 11 PM Tue Dec 2nd</td>
<td>COD x 2</td>
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<tr>
<td>10-Dec</td>
<td>W</td>
<td>20</td>
<td></td>
<td>Review, questions etc</td>
<td>COD x 4</td>
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</tr>
<tr>
<td>16-Dec</td>
<td>TUE</td>
<td></td>
<td></td>
<td>Final 12-3 PM</td>
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</tr>
</tbody>
</table>
5. Detailed course schedule

**PLEASE NOTE** It is your responsibility to check the class website several times weekly for revisions to weekly readings, etc.**

This schedule includes required readings, and dates for assignments, quizzes and final exam. Reading assignments should be completed before the class meeting where they are listed week. Assigned readings are given in the order in which they should be read. Where no pages are listed, read the entire paper. Additional readings may be assigned.

5.1. Introduction

**Monday October 6th, class #1**

ANNOUNCEMENTS
The syllabus is a contract between you and the instructor. It is your responsibility to read it carefully.

LECTURE/DISCUSSION
Introduction
Basic plant genetics necessary for our class. Sources of crop genetic diversity.
How the course works

READINGS/ASSIGMENTS TO COMPLETE BEFORE COMPLETING ASSIGNMENT #1
Read
  a) ES 158 Class Syllabus
  b) Open Learning Initiative (OLI). [FOR ALL ASSIGNMENTS COMPLETE “Did I get this?” and “Learn by doing” activities] https://oli.cmu.edu/course/webui/guest/join.do?section=introbio . This is the portal for
  Introduction to biology ➔ enter course without an account ➔ Unit 7: Classical genetics, modules 28, 29, 30.

ANNOUNCEMENTS
TAKE NOTE! ➔ Assignment #1, Introductory essay due Wednesday October 8th online by 10 AM

**Wednesday October 8th, class #2 IS CANCELLED!!!**

**Monday October 13th, class #3**

LECTURE/DISCUSSION
What is the sources of crop genetic diversity at the individual level? What processes shape crop diversity?

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY
Read
  a) Open Learning Initiative (OLI). [FOR ALL ASSIGNMENTS COMPLETE “Did I get this?” and “Learn by doing” activities] https://oli.cmu.edu/course/webui/guest/join.do?section=introbio . This is the portal for
  Introduction to biology ➔ enter course without an account ➔ Unit 9: Microevolution, complete module 38 through p228

CROP OF THE DAY: Maize

5.2. Where do food crops come from? Crop domestication, distribution and description

**Wednesday October 15th, class #4**

ANNOUNCEMENTS
Field trip this coming Monday Oct 20th (class 5). Meet @ or before 12:30 PM ¡SHARP! at the CCBER nursery on campus (W of Harder Stadium, just N of UCSB Garden & Greenhouse project, map on ES 158 GS week 2 block). Be ready to take notes. We will be outside the entire period, bring hat & water if you need them.
LECTURE/DISCUSSION
How did people interact with food plants before domestication?

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

CROP OF THE DAY: Cacao

Monday October 20th, class #5

ANNOUNCEMENTS
Field trip TODAY: Meet @ or before 12:30 PM SHARP! at the CCBER nursery behind the UCSB Greenhouse and Garden Project (on campus, see above for details). Be ready to take notes. We will be outside the entire period, bring hat & water if you need them.

***Quiz #1 will be Wednesday October 22nd. Covers ALL material through today's class #5.

LECTURE/DISCUSSION
Predomestication in your backyard: Traditional Chumash food plants
Guest speaker: Wayne Chapman, Nursery and Greenhouse Manager, Cheadle Center for Biodiversity and Ecological Restoration (CCBER), UCSB.

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

Wednesday October 22nd, class #6

ANNOUNCEMENTS
Quiz #1 is TODAY! Covers ALL material through Monday October 20th, class #5

LECTURE/DISCUSSION
What is food plant domestication and how did it occur?

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

The article below is NOT required reading, but posted as a resource


CROPS OF THE DAY

Monday October 27th, class #7

ANNOUNCEMENTS
FIELD TRIP Next Monday November 3rd meet @ 12:30 PM SHARP! at the Isla Vista Parks Department community garden immediately south of Estero Park, just west of Camino del Sur—see the map on class website, week 4. Be ready to take notes, bring laptop for diversity indices calculations. We will be outside the whole time, prepare accordingly.

LECTURE/DISCUSSION
What is food plant domestication and how did it occur?, cont.

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

CROPS OF THE DAY

5.3. How can food crop diversity be measured?

Wednesday October 29th, class #8

ANNOUNCEMENTS
FIELD TRIP Next Monday November 3rd meet @ 12:30 PM SHARP! at the Isla Vista Parks Department community garden immediately south of Estero Park, just west of Camino del Sur—see the map on class website, week 4. Be ready to take notes, bring laptop for diversity indices calculations. We will be outside the whole time, prepare accordingly.

LECTURE/DISCUSSION
How can FCD be measured? Different perspectives, an example of Phaseolus beans in Oaxaca, Mexico.

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

CROPS OF THE DAY

Monday November 3rd, class #9

ANNOUNCEMENTS
FIELD TRIP TODAY! Meet @ 12:30 PM SHARP! at the Isla Vista Parks Department community garden immediately south of Estero Park, just west of Camino del Sur—see the map on class website, week 5. Be ready to take notes, bring laptop for diversity indices calculations. We will be outside the whole time, prepare accordingly.

LECTURE/DISCUSSION
Richness and evenness: practical descriptions of diversity in the landscape

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

5.4. Where is FCD now and who can use it?

Wednesday November 5th, class #10

ANNOUNCEMENTS
Quiz #2 in one week, on Wednesday November 12th, covers all material through class #11 (Monday Nov 10th)
Assignment #3, diversity index practice, due in one week, Wed Nov 11th before 11PM.
LECTURE/DISCUSSION
What is the conventional approach to FCD conservation?

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

Article below is posted as a resource, NOT a required reading


CROPS OF THE DAY

**Monday November 10**\(^{th}\), class #11

ANNOUNCEMENTS
Quiz #2 this Wednesday November 12\(^{th}\), covers all material through today (Monday Nov 10\(^{th}\))
Assignment #3, diversity index practice, due tomorrow Wed Nov 11\(^{th}\) before 11PM.

LECTURE/DISCUSSION
What are alternative methods of FCD conservation? Guest speaker via Skype: Flavio Aragón-Cuevas, MSc, Senior Genetic Resources Specialist and Founder of the Oaxaca Germplasm Bank, INIFAP, Oaxaca, Mexico

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY


CROPS OF THE DAY

**Wednesday November 12**\(^{th}\), class #12

ANNOUNCEMENTS
Quiz #2 TODAY!
Assignment #4, market diversity due in one week, Tue Nov 18\(^{th}\) before 11 PM.

LECTURE/DISCUSSION
How do farmers and formal plant breeders use FCD?

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

5.5. Different approaches to using diversity for crop improvement.

CROPS OF THE DAY

Monday November 17th, class #13
ANNOUNCEMENTS
Assignment #4, market diversity due tomorrow, Tue Nov 18th before 11 PM.

LECTURE/DISCUSSION
What are new approaches to using FCD in crop improvement and what are their implications?

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY

CROPS OF THE DAY

Wednesday November 18th, class #14
ANNOUNCEMENTS
Quiz #3 Monday

LECTURE/DISCUSSION
Do seed systems matter?

READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY
d) Phillip Howard’s MSU homepage with current seed industry data & visualizations.

CROPS OF THE DAY

Monday November 24th, class #15
ANNOUNCEMENTS
Review harvest feast assignment—ask questions now! Due online by Tuesday December 2nd 11PM.
Quiz #3 one week from today, Monday December 1st.
Field trip to Goodland Organics farm on Wednesday December 3rd. Leave from drop off circle in front of Campbell hall, see map on class GS, week 9.
LECTURE/DISCUSSION
How are people trying to take back seed systems? Skype discussion with David King, founder of the Seed Library of Los Angeles (SLOLA)

READINGS/ASSIGMENTS TO COMPLETE FOR TODAY
b) SELC (2014). Setting the record straight on the legality of seed libraries, Shareable.net.

CROPS OF THE DAY

5.6. What is FCD useful for?

Wednesday November 26th, class #16
ANNOUNCEMENTS
Review harvest feast assignment—ask questions now! Due online by Tuesday December 2nd 11PM.
Field trip to Goodland Organics farm on Wednesday December 3rd. Leave from drop off circle in front of Campbell hall, see map on class GS, week 9. BE THERE AT OR BEFORE 12:30 OR YOU WILL MISS THE VAN!

LECTURE/DISCUSSION
Why is food crop diversity agronomically useful?

READINGS/ASSIGMENTS TO COMPLETE FOR TODAY

CROPS OF THE DAY

Monday December 1st, class #17
ANNOUNCEMENTS
Quiz #3 TODAY!
Harvest feast assignment due online TOMORROW Tuesday December 2nd by 11PM.
Field trip to Goodland Organics farm this Wednesday December 3rd!! Leave from drop off circle in front of Campbell hall, see map on class GS, week 9. BE THERE AT OR BEFORE 12:30 OR YOU WILL MISS THE VAN!

LECTURE/DISCUSSION
Can FCD help us cope with economic and climatic change?

READINGS/ASSIGMENTS TO COMPLETE FOR TODAY
b) Go through the entire FasTrack crop improvement website (i.e., each of the pages listed on the menu L side of this website: http://ucanr.org/sites/fastrack/)
c) CCPP n.d. Citrus Clonal Protection Program. UCR, Riverside, CA.
d) Look at the UCR Citrus Variety Collection website http://www.citrusvariety.ucr.edu/index.html

CROPS OF THE DAY
**Wednesday December 3rd, class #18**

**ANNOUNCEMENTS**
FIELD TRIP: Goodland Organics farm TODAY Wednesday December 3rd!! Leave from drop off circle in front of Campbell hall, see map on class GS, week 9. BE THERE AT OR BEFORE 12:30 OR YOU WILL MISS THE VAN!

**LECTURE/DISCUSSION**
New specialty crops on the south coast of CA. Guest speaker Jay Ruskey, farmer/owner Good Land Organics

**READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY**


**Monday December 8th, class #19**

**ANNOUNCEMENTS**
FINAL EXAM Tuesday December 16th, 12-3 PM in our regular classroom

**LECTURE/DISCUSSION**
Cuisine and diversity. Can breadbaking save wheat diversity? Guest speaker via skype: Dr. Steve Jones, Director, WSU Research and Extension Center at Mt Vernon, WA

**READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY**


d) Barber, D 2014 interviews, Eater.com, Yale 360.

**CROPS OF THE DAY**

**Wednesday December 10th, class #20**

**ANNOUNCEMENTS**
FINAL EXAM Tuesday December 16th, 12-3 PM in our regular classroom

**LECTURE/DISCUSSION**
Harvest feast assignment highlights, comments.
Review

**READINGS/ASSIGNMENTS TO COMPLETE FOR TODAY**
Review the study questions, bring your questions to ask in class

**CROPS OF THE DAY**

**FINAL EXAM Tuesday December 16th, 12 – 3 PM**