

Hort/Agron 360. Genetically Modified Crops: Science, Regulation & Controversy

Spring 2018, 2 credits

Mon & Wed 1:20 – 2:10 pm

Professor: Jeffrey Endelman (endelman@wisc.edu), Moore 327

Office hours: Wed 2:30 – 3:30 pm or by appointment

Prerequisite: One of the following: Bot 130, Biol 151, Biocore 381, Genetics 160, Genetics 466, Zool 101

Course description

Explores how and why GM crops are created and their regulation at the federal and state level. Through case studies, students will learn about the impacts of GM crops and critically evaluate arguments both for and against their use. Readings and discussion introduce students to the complex economic, cultural, and political issues surrounding GM crops.

Learning outcomes

Upon completion of the course, students should be able to

- Explain how GMOs are made and compare genetic engineering with other plant breeding methods.
- Describe federal laws and regulations about GMOs.
- Describe how litigation has been used to advance and obstruct the use of GMOs.
- Evaluate arguments both for and against the safety and sustainability of GMOs.

Textbook

Charles, D. 2001. *Lords of the Harvest: Biotech, Big Money, and the Future of Food*. Perseus: Cambridge, MA.

Additional reading assignments will be distributed through Learn@UW.

Policies

- Quizzes must be completed before the deadline through Learn@UW. No credit will be given for late quizzes.
- Late writing assignments will be penalized 20% for every 24 hours past the deadline (i.e., 0–24 h late = 20% penalty, 24–48 h late = 40% penalty).
- You are welcome to **discuss** homework with other students, but you **may not read** the written assignments of others. For more information about the academic integrity policy of UW-Madison, visit <http://www.students.wisc.edu/doso/academic-integrity/>
- Exams will be open-book, open-note.

Grading

5% Participation

15% Reading quizzes

30% Two writing assignments

25% Midterm

25% Final exam

Writing Assignments

1. A 6–8 page report describing the US regulatory process and outcome for a genetically engineered (GE) crop.
2. A 5–7 page report in which, after presenting both sides of a controversy related to GE crops, you discuss your perspective.

Grades

Course grades will be assigned based on the following breakpoints, where X is the final numeric grade. After reviewing the class distribution, the breakpoints may be lowered but will not be raised.

A	$92 \leq X$
AB	$88 \leq X < 92$
B	$82 \leq X < 88$
BC	$78 \leq X < 82$
C	$70 \leq X < 78$
D	$60 \leq X < 70$
F	$X < 60$

Syllabus Disclaimer

The following list of topics and schedule provide an overview of the course, but should changes become necessary, an updated schedule will be posted to Learn@UW and students will be notified by email.

Abbreviations:

LH = Lords of the Harvest

NA04 = National Academies 2004 report

NA16 = National Academies 2016 report

Week	Date	Day	Topic	Reading	Assignment
1	Jan. 18	W	Introduction, discussion		
2	Jan. 23	M	Methods of genetic modification	NA04 p. 23-28 Crop Reproduction FIBL Breeding (optional)	
	Jan. 25	W	Methods of genetic modification	NA16 p. 36-37, 41-49 Recombinant DNA LH Prologue, Chap. 1	
3	Jan. 30	M	U.S. Patent Law	Seed Wars Chap. 3	Quiz 1 due
	Feb. 1	W	Promoters, Bt genes	LH Chap. 3 and 4	
Week	Day	Day	Topic	Reading	Assignment
4	Feb. 6	M	Unintended effects	LH Chap. 5 Snow et al. (optional)	Quiz 2 due
	Feb. 8	W	Unintended effects, continued	NA04 p. 39-49 Bradford et al. p. 785-789 Wilson et al. (optional)	

5	Feb. 13	M	FDA regulations	FDA 1992 policy, p. 1-19	Quiz 3 due
	Feb. 15	W	USDA regulations Assignment #1	NY Times (2015, 2017) NA16 p. 241-245, 331 Gene edited potato (optional)	
6	Feb. 20	M	Gene editing EPA, Other Countries	NA16 p. 310-321 Cibus-gene editing (optional)	
	Feb. 22	W	Roundup Ready (RR) crops	LH Chap. 2, 8	Quiz 4 due
7	Feb. 27	M	RR Soybean 40-3-2	LH Chap. 6	Assign#1 topic due
	Mar. 1	W	Opposition to GE		Quiz 5 due
8	Mar. 6	M	Midterm		
	Mar. 8	W	Controversy: Glyphosate safety	Beyond Pesticides NA16 p. 137-138, 153-154	
9	Mar. 13	M	<i>Midterm solutions</i> Roundup-resistant weeds	NA16 p. 87-90 (Weeds) Feeding trials: NA16 p. 122-128	
	Mar. 15	W	Controversy: Animal feeding <i>Assignment #2 Survey</i>		Assignment #1 due 3/26 at 5 pm
Spring Break Mar. 20-24					
10	Mar. 27	M	<i>Discuss Assign #1</i> FLAVR SAVR Tomato	NA16 p. 51-53, 240 LH Chap. 10	Quiz 6 (RR controversies)
	Mar. 29	W	Seed industry <i>Organize for Assign #2</i>	LH Chap. 9, 11	
11	April 3	M	Seed-saving, patent enforcement		Quiz 7 (LH Chap. 9-11)
	April 5	W	Genetic contamination RR alfalfa and beets	GMO/organic contamination	
12	April 10	M	Labeling	National Labeling Law	
	April 12	W	Bt crops	LH Chap. 12	Assign #2 position papers due
13	April 17	M	<i>Assignment #2 Group work</i>		Quiz 8
	April 19	W	<i>Assign #2 Discussion</i>		
14	April 24	M	Pharming Engineering consumer traits		
	April 26	W	Preparing and Communicating the NA16 Report (Brossard)		
15	May 1	M	GE animals		
	May 3	W	Wrap-up Course Evaluation and Survey		Assign #2 final report due