



SYLLABUS ENTMLGY 5800: PESTICIDE SCIENCE SPRING 2023

Course Information

- **Course times and location:**

Lectures: Recorded and available in Carmen to be completed at any time during the week assigned (asynchronous). Quizzes, Discussions and Exams: Administered through Carmen and available to be completed any time during the week assigned.

- **Credit hours:** 3

- **Mode of delivery:** 100% Online

Instructors

Dr. Ashley Leach, Assistant Professor of Entomology

Email: leach.379@osu.edu

Phone Number: 330-263-9723

Office location: 254 Wooster Science Building (Wooster)

Office hours: Zoom on Wednesdays from 3:30- 4:30PM

<https://osu.zoom.us/j/97715542174?pwd=SnFweklGU0RlQ3FhYncwTFRZcVI5UT09>

Passcode: 278725

Preferred means of communication: email



Dr. Reed Johnson, Associate Professor of Entomology

Email: johnson.5005@osu.edu

Phone Number: 330-202-3523

Office location: 352 Wooster Science Building (Wooster)

Office hours: Zoom on Mondays and Fridays 3:00 – 4:00PM

<https://osu.zoom.us/j/93136074496?pwd=MHlZdW1PbkNkekNJYSt2dzR6YkxaQT09>

Passcode: 655483

Preferred means of communication: email



Class-wide communications will be sent through Announcements in Carmen. Check your [notification preferences](#) to be sure you receive these messages

Teaching Assistant

Name: Brandon Shannon, graduate student in the Environmental Studies Graduate Program

Email: shannon.325@osu.edu

Office hours: Zoom by appointment

Course Prerequisites

None

Course description

Exploration of pesticide toxicology and practical use; modes of action in target organisms, regulations, application methods, environmental fate, resistance management, and use in integrated pest management programs.

Course learning outcomes

Course Part	Learning objective
	Upon completion of this course, students should be able to:
1: Introductory concepts, pesticide regulations, and pesticide safety	define toxicity and explain how toxicity is measured.
	recognize the laws that govern pesticide registration and use.
	demonstrate how to find critical information on a pesticide label.
	explain how to follow safety procedures when handling pesticides.
2. Pesticide mode of action	explain the biochemical modes of action of common insecticides, herbicides, and fungicides.
	explain how adjuvants and synergists can influence pesticide deposition and efficacy.
3: Pesticide application methods	explain how to calculate the amount of pesticide and water to put in a sprayer.
	explain how to select the most appropriate type of application equipment for various needs.
	explain how to calibrate a sprayer.
4: Procedures for evaluating pesticides	interpret the results of pesticide efficacy tests.
	explain procedures that are used to evaluate pesticide toxicity, efficacy, and coverage.
	evaluate the risk and determine the environmental fate of pesticides.

5: Use of pesticides within IPM programs	understand the principals of Integrated Pest Management (IPM)
	find information on toxicity of pesticides to non-target organisms.
	understand the role of biotechnology in pest management.
	describe why pesticide applications can fail to control a problem.
	explain why pesticide resistance can develop, describe the mechanisms of resistance, and explain how resistance is best managed.
	define the Environmental Impact Quotient and understand how it is used to compare various pesticide programs.

How This Course Works

Mode of delivery: This is an online distance course. Lectures are pre-recorded and will be available in an asynchronous format for viewing any time during the week they are assigned. Worksheets, discussions, quizzes and exams will all be administered through Carmen.

Pace of online activities: This course is divided into **weekly modules** that are released each week at 8AM on Mondays. Weekly quizzes are due at 11:59PM on Fridays and weekly worksheets are due at 11:59PM on Sundays. Students are expected to keep pace with weekly deadlines but may schedule their efforts freely within that time frame.

Credit hours and work expectations: This is a 3 credit-hour course. According to [Ohio State bylaws on instruction](https://go.osu.edu/credithours) (go.osu.edu/credithours), students should expect around 3 hours per week of time spent on direct instruction (instructor content and Carmen activities, for example) in addition to 6 hours of homework (reading and assignment preparation, for example) to receive a grade of [C] average.

Attendance and participation requirements: Research shows regular participation is one of the highest predictors of success. With that in mind, I have the following expectations for everyone's participation:

- **Participating in online activities for attendance: at least once per week**
You are expected to log in to the course in Carmen every week. During most weeks you will probably log in many times. If you have a situation that might cause you to miss an entire week of class, discuss it with me *as soon as possible*.
- **Completion of worksheets: once per week**
You are expected to complete worksheets where you will apply the skills learned and submit a PDF version in Carmen.
- **Participating in discussion forums: less than one per week, as assigned**
As part of your participation, each week you can expect to post as part of our substantive class discussion on the week's topics.
- **Zoom meetings and office hours: optional**
All live, scheduled events for the course, including my office hours, are optional. I will post recordings of synchronous sessions for those who cannot attend.

Course Materials, Fees and Technologies

Required Materials and/or Technologies

None

Recommended/Optional Materials and/or Technologies

O'Connor-Marer, Patrick J. 2016. The Safe and Effective Use of Pesticides, 3rd Edition. University of California, Statewide Integrated Pest Management Program, Agriculture and Natural Resources, Publication 3324. (\$48.00, print, available direct from the publisher at <http://anrcatalog.ucdavis.edu/Details.aspx?itemNo=3324>)

Required Equipment

- **Computer:** current Mac (MacOS) or PC (Windows 10) with high-speed internet connection.
- **Other:** a mobile device (smartphone or tablet) to use for BuckeyePass authentication

If you do not have access to the technology you need to succeed in this class, review options for [technology and internet access](http://go.osu.edu/student-tech-access) (go.osu.edu/student-tech-access).

Required Software

Microsoft Office 365: All Ohio State students are now eligible for free Microsoft Office 365. Visit the [installing Office 365](http://go.osu.edu/office365help) (go.osu.edu/office365help) help article for full instructions.

CarmenCanvas Access

You will need to use [BuckeyePass](http://buckeyepass.osu.edu) (buckeyepass.osu.edu) multi-factor authentication to access your courses in Carmen. To ensure that you are able to connect to Carmen at all times, it is recommended that you do each of the following:

- Register multiple devices in case something happens to your primary device. Visit the [BuckeyePass - Adding a Device](http://go.osu.edu/add-device) (go.osu.edu/add-device) help article for step-by-step instructions.
- Request passcodes to keep as a backup authentication option. When you see the Duo login screen on your computer, click **Enter a Passcode** and then click the **Text me new codes** button that appears. This will text you ten passcodes, good for 365 days, that can each be used once.
- [Install the Duo Mobile application](http://go.osu.edu/install-duo) (go.osu.edu/install-duo) on all of your registered devices for the ability to generate one-time codes in the event that you lose cell, data, or Wi-Fi service.

If none of these options will meet the needs of your situation, you can contact the IT Service Desk at [614-688-4357 \(HELP\)](tel:614-688-4357) and IT support staff will work out a solution with you.

Technology Skills Needed for This Course

- Basic computer and web-browsing skills
- [Navigating CarmenCanvas](https://go.osu.edu/canvasstudent) (go.osu.edu/canvasstudent)
- [CarmenZoom virtual meetings](https://go.osu.edu/zoom-meetings) (go.osu.edu/zoom-meetings)

Technology Support

For help with your password, university email, CarmenCanvas, or any other technology issues, questions or requests, contact the IT Service Desk, which offers 24-hour support, seven days a week.

- **Self Service and Chat:** go.osu.edu/it
- **Phone:** [614-688-4357 \(HELP\)](tel:614-688-4357)
- **Email:** servicedesk@osu.edu

Grading and Response Time

How Your Grade is Calculated

Category	Points	% of total
Worksheets (13, each 25 points)	325	40
Quizzes (40, each 3 points)	120	15
Discussion/Participation (7, each 10 points)	70	9
Midterm worksheet	50	6
Midterm exam	75	9
Final worksheet	75	9
Final exam	100	12
Total	815	100

Grading scale

Grade	Graduate students				Undergraduate students			
	minimum		maximum		minimum		maximum	
A	93	%	100.0	%	91	%	100.0	%
A-	90	%	92.9	%	88	%	90.9	%
B+	87	%	89.9	%	85	%	87.9	%
B	83	%	86.9	%	81	%	84.9	%
B-	80	%	82.9	%	78	%	80.9	%
C+	77	%	79.9	%	75	%	77.9	%
C	73	%	76.9	%	71	%	74.9	%
C-	70	%	72.9	%	68	%	70.9	%
D+	67	%	69.9	%	65	%	67.9	%
D	60	%	66.9	%	58	%	64.9	%
E	0	%	59.9	%	0	%	57.9	%

Instructor Feedback and Response Time

We are providing the following list to give you an idea of our intended availability throughout the course. Remember that you can call [614-688-4357 \(HELP\)](tel:614-688-4357) at any time if you have a technical problem.

- Preferred contact method:** If you have a question, please contact us through a private message in Carmen or through an e-mail to johnson.5005@osu.edu or leach.379@osu.edu. We will reply within **24 hours on days when class is in session at the university**.
- Class announcements:** We will send all important class-wide messages through the Announcements tool in CarmenCanvas. Please check [your notification preferences](http://go.osu.edu/canvas-notifications) (go.osu.edu/canvas-notifications) to ensure you receive these messages.
- Discussion board:** We will check and reply to messages in the discussion boards once mid-week and once at the end of the week.
- Grading and feedback:** For assignments submitted before the due date, we will try to provide feedback and grades within **seven days**. Assignments submitted after the due date may have reduced feedback and grades may take longer to be posted.

Descriptions of Major Course Assignments

Worksheets

There are 13 worksheets related to the topics covered in lectures. Many of these involve finding information on websites. Some involve calculations. In most weeks, there is one worksheet to be completed. Each worksheet is due at 11:59 PM on a Sunday, on the date specified in the **Error! Not a valid bookmark self-reference.** We offer the opportunity to re-submit a worksheet if the score is 17 or lower, out of 25 points maximum; the resubmission must be within 7 days of when the grade was posted.

Each worksheet must be turned in only through Carmen, only in PDF format. You can submit a PDF file made using the camera on your phone; I recommend “Microsoft Lens” available free in the Google Play Store or the App Store.

Academic integrity and collaboration: Students may work together on worksheets and will be required to use online tools, course notes and other resources.

Quizzes

Quizzes will be administered in Carmen each week. A quiz will cover the material covered in each lecture topic. There will be three quizzes in most weeks. Quiz questions will consist of multiple choice and short answer questions and may be similar to questions appearing on the midterm and final exams. There is no time limit for completing quizzes and students have one opportunity to resubmit the quiz before the deadline. The score from the last submitted quiz will be recorded. Quizzes are worth 3 points each and will be **due on Friday nights at 11:59 PM**. Please note that this is two days earlier than the worksheet and discussion deadlines.

Academic integrity and collaboration: Students may work together on quizzes and may use notes and other course resources.

Exams

There are two exams, a midterm and a final, and both exams will be administered in two parts that can be completed in any order. **Part 1 is an online “Carmen quiz”** that can be started at any time during the exam period but must be completed within a strictly enforced time limit (55 minutes for the midterm and 110 minutes for the final exam). **Part 2 is a worksheet** for which there is no time limit. Both components of the final exam will be available to complete during the final exam period. Refer to the **Error! Not a valid bookmark self-reference.** for exam dates.

Academic integrity and collaboration: You are free to consult any resources or your own notes, but you are not allowed to communicate with another class member or any other people who are knowledgeable of the topic while you are taking either Part 1 or Part 2 of the exams.

Discussion Forum

Students must participate in seven written discussions via Carmen, including an introductory discussion of self-introduction during the first week. The topic of each discussion will be announced at least a week prior to the due date for posting. **Each is due by 11:59 PM on a Sunday**, on the date specified in the **Error! Not a valid bookmark self-reference.** Each discussion is worth 10 points. Points will be awarded based on the following rubric:

Demonstrates knowledge of topic from course materials	Makes several clear connections with lectures/reading (3 points)	Makes a connection with lectures/reading with few errors (2.5 points)	Makes a cursory connection with lectures/reading with some errors (2 points)	Makes few or incorrect connections with lectures/reading (1 point)
Contributes to discussion of topic	Contributes new ideas with thoughtful and relevant insight (4 points)	Adds some relevant insight (3 points)	Repeats previous comments with little additional insight (2 points)	Makes token contribution or is irrelevant(1 point)
Written clearly in proper English	Makes a clear point with no language errors (2 points)	Clear with a few language errors (1.5 points)	Somewhat disorganized with some language errors (1 point)	Difficult to understand with many language errors (0.5 point)
Builds on prior posts*	Directly responds to or builds on ideas in previous posts (1 point)		Does not respond to or build on previous posts (0.5 points)	

* The first student to post in each discussion will automatically receive 1 point in this category

Discussion and communication guidelines

The following are our expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful.

- **Writing style:** While there is no need to participate in class discussions as if you were writing a research paper, you should remember to write using good grammar, spelling, and punctuation. Informality (including an occasional emoticon) is fine for non-academic topics.
- **Tone and civility:** Let's maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm doesn't always come across online.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. (For course materials, list at least the title and page numbers. For online sources, include a link.)

- **Backing up your work:** Consider composing your academic posts in a word processor, where you can save your work, and then copying into the Carmen discussion.

Due dates, late submission and resubmission policy

Please refer to Carmen for up-to-date due dates. **No late submissions will be accepted.** Exceptions will be made for medical excused absences with documentation. Exams may be rescheduled if you have an excused absence during the examination period.

Worksheets receiving a score of 17 out of 25 or below are eligible to be revised and resubmitted within 7 days after the graded worksheet is returned. Exam, exam worksheets, quizzes, and discussion posts may not be resubmitted.

Other Course Policies

Academic Integrity Policy

See [Descriptions of Major Course Assignments](#) for specific guidelines about collaboration and academic integrity in the context of this class.

Ohio State's Academic Integrity Policy

Academic integrity is essential to maintaining an environment that fosters excellence in teaching, research, and other educational and scholarly activities. Thus, The Ohio State University and the Committee on Academic Misconduct (COAM) expect that all students have read and understand the university's [Code of Student Conduct](#) (studentconduct.osu.edu), and that all students will complete all academic and scholarly assignments with fairness and honesty. Students must recognize that failure to follow the rules and guidelines established in the university's *Code of Student Conduct* and this syllabus may constitute "Academic Misconduct."

The Ohio State University's *Code of Student Conduct* (Section 3335-23-04) defines academic misconduct as: "Any activity that tends to compromise the academic integrity of the university or subvert the educational process." Examples of academic misconduct include (but are not limited to) plagiarism, collusion (unauthorized collaboration), copying the work of another student, and possession of unauthorized materials during an examination. Ignorance of the university's *Code of Student Conduct* is never considered an excuse for academic misconduct, so I recommend that you review the *Code of Student Conduct* and, specifically, the sections dealing with academic misconduct.

If I suspect that a student has committed academic misconduct in this course, I am obligated by university rules to report my suspicions to the Committee on Academic Misconduct. If COAM determines that you have violated the university's *Code of Student Conduct* (i.e., committed academic misconduct), the sanctions for the misconduct could include a failing grade in this course and suspension or dismissal from the university.

If you have any questions about the above policy or what constitutes academic misconduct in this course, please contact me.

Other sources of information on academic misconduct (integrity) to which you can refer include:

- [Committee on Academic Misconduct](http://go.osu.edu/coam) (go.osu.edu/coam)
- [Ten Suggestions for Preserving Academic Integrity](http://go.osu.edu/ten-suggestions) (go.osu.edu/ten-suggestions)
- [Eight Cardinal Rules of Academic Integrity](http://go.osu.edu/cardinal-rules) (go.osu.edu/cardinal-rules)

Copyright for Instructional Materials

The materials used in connection with this course may be subject to copyright protection and are only for the use of students officially enrolled in the course for the educational purposes associated with the course. Copyright law must be considered before copying, retaining, or disseminating materials outside of the course.

Creating an Environment Free from Harassment, Discrimination, and Sexual Misconduct

The Ohio State University is committed to building and maintaining a community to reflect diversity and to improve opportunities for all. All Buckeyes have the right to be free from harassment, discrimination, and sexual misconduct. Ohio State does not discriminate on the basis of age, ancestry, color, disability, ethnicity, gender, gender identity or expression, genetic information, HIV/AIDS status, military status, national origin, pregnancy (childbirth, false pregnancy, termination of pregnancy, or recovery therefrom), race, religion, sex, sexual orientation, or protected veteran status, or any other bases under the law, in its activities, academic programs, admission, and employment. Members of the university community also have the right to be free from all forms of sexual misconduct: sexual harassment, sexual assault, relationship violence, stalking, and sexual exploitation.

To report harassment, discrimination, sexual misconduct, or retaliation and/or seek confidential and non-confidential resources and supportive measures, contact the Office of Institutional Equity:

1. Online reporting form at equity.osu.edu,
2. Call 614-247-5838 or TTY 614-688-8605,
3. Or Email equity@osu.edu

The university is committed to stopping sexual misconduct, preventing its recurrence, eliminating any hostile environment, and remedying its discriminatory effects. All university employees have reporting responsibilities to the Office of Institutional Equity to ensure the university can take appropriate action:

- All university employees, except those exempted by legal privilege of confidentiality or expressly identified as a confidential reporter, have an obligation to report incidents of sexual assault immediately.
- The following employees have an obligation to report all other forms of sexual misconduct as soon as practicable but at most within five workdays of becoming aware of such information: 1. Any human resource professional (HRP); 2. Anyone who supervises faculty, staff, students, or volunteers; 3. Chair/director; and 4. Faculty member."

This course adheres to The Principles of Community adopted by the College of Food, Agricultural, and Environmental Sciences. These principles are located on the Carmen site for this course; and can also be found at <https://go.osu.edu/principlesofcommunity>. For additional information on Diversity, Equity, and Inclusion in CFAES, contact the CFAES Office for Diversity, Equity, and Inclusion (<https://equityandinclusion.cfaes.ohio-state.edu/>). If you have been a victim of or a witness to a bias incident, you can report it online and anonymously (if you choose) at <https://studentlife.osu.edu/bias/report-a-bias-incident.aspx>.

Your Mental Health

As a student you may experience a range of issues that can cause barriers to learning, such as strained relationships, increased anxiety, alcohol/drug problems, feeling down, difficulty concentrating and/or lack of motivation. These mental health concerns or stressful events may lead to diminished academic performance or reduce a student's ability to participate in daily activities. The Ohio State University offers services to assist you with addressing these and other concerns you may be experiencing. If you or someone you know are suffering from any of the aforementioned conditions, you can learn more about the broad range of confidential mental health services available on campus via the Office of Student Life Counseling and Consultation Services (CCS) by visiting ccs.osu.edu or calling (614) 292- 5766. CCS is located on the 4th Floor of the Younkin Success Center and 10th Floor of Lincoln Tower. You can reach an on-call counselor when CCS is closed at (614) 292-5766 and 24 hour emergency help is also available through the 24/7 National Suicide Prevention Hotline at 1-(800)-273-TALK or at suicidepreventionlifeline.org

David Wirt, wirt.9@osu.edu, is the CFAES embedded mental health counselor. He is available for new consultations and to establish routine care. To schedule with David, please call 614-292-5766. Students should mention their affiliation with CFAES when setting up a phone screening.

Accessibility Accommodations for Students with Disabilities

Requesting Accommodations

The university strives to make all learning experiences as accessible as possible. If you anticipate or experience academic barriers based on

your disability including mental health, chronic or temporary medical conditions, please let me know immediately so that we can privately discuss options. To establish reasonable accommodations, I may request that you register with [Student Life Disability Services \(SLDS\)](#). After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. In light of the current pandemic, students seeking to request COVID-related accommodations may do so through the university's [request process](#), managed by Student Life Disability Services.

Disability Services Contact Information

- Phone: [614-292-3307](tel:614-292-3307)
- Website: slds.osu.edu
- Email: slds@osu.edu
- In person: [Baker Hall 098, 113 W. 12th Avenue](#)

Accessibility of Course Technology

The online components of this course require use of CarmenCanvas (Ohio State's learning management system) and other online communication and multimedia tools. If you need additional services to use these technologies, please request accommodations as early as possible.

- [CarmenCanvas accessibility](http://go.osu.edu/canvas-accessibility) (go.osu.edu/canvas-accessibility)
- Streaming audio and video
- [CarmenZoom accessibility](http://go.osu.edu/zoom-accessibility) (go.osu.edu/zoom-accessibility)

Course Schedule

Week (start Mon., end Sun.)	Topic	Activity (& due date)	Instructor
Part 1: Introductory concepts, pesticide regulations, & pesticide safety			
1 1/9-1/15	Intro to how this course works Categories and history pesticidal substances Pros and cons of pesticide use	Intro discussion (1/15)	Reed Johnson
	Toxicity measures; EPA toxicity categories Classification by mode of action vs origin Information on SDS sheets	Toxicity measures worksheet (1/15)	Reed Johnson
1	Pesticide laws: FIFRA, WPS, FQPA Pesticide agencies: EPA, ODA Pesticide applicator certification		Ashley Leach
2 1/17-1/22 MLK Day 1/16	Pesticide registration - The registration process - Reduced risk products - Special registrations: section 18, section 24C - The IR-4 program for minor crop registration	Section 18 discussion (1/22)	Reed Johnson
2	Pesticide registration: From discovery to market		Bridget O'Neill (DuPont/Corteva)
2	Pesticide labeling - Components of label - EPA crop groupings	Labels worksheet (1/22) Crop groupings worksheet (1/29)	Reed Johnson
3 1/23-1/29	Pesticide formulations Compatibility of mixed pesticides		Reed Johnson
	Pesticide residue tolerances on food crops The Risk Cup concept		Reed Johnson
3	Pesticides and organic agriculture; the OMRI lists	Organic discussion (1/29)	Ashley Leach
3	Safety: personal protective equipment Safety in storage, disposal, transportation Emergencies and first aid		Reed Johnson
Part 2: Pesticide mode of action			
4 1/30-2/5	Insecticide classification and mode of action; IRAC	Mode of action worksheet (2/5)	Reed Johnson
4	Insecticides, continued, plus molluscicides		Reed Johnson
4	Fungicide classification and mode of action; FRAC		Francesca Hand
5 2/6-2/14	Herbicide classification and mode of action; FRAC		Kent Harrison
5	Adjuvants and synergists used with pesticides		Reed Johnson

Week (start Mon., end Sun.)	Topic	Activity (& due date)	Instructor
Part 3: Pesticide application methods			
5	Rate calculations; determining amounts of pesticide and water	Rate calculations worksheet (2/12)	Ashley Leach
6 2/13-2/19	Intro to effective & efficient application		Erdal Ozkan
6	Overview of application equipment and use: hydraulic boom, air-assist, electrostatic, airblast		Erdal Ozkan
6	Nozzle selection; Interactions of pressure, volume, speed	Calibration worksheet (2/26)	Erdal Ozkan
7 2/20-2/26	Calibration methods		Erdal Ozkan
7	Systemic pesticides: deployment methods; chemigation	Systemics in food discussion (2/26)	Reed Johnson
	Specialty applicators: tree injection; soil treatment		Dan Herms
8 2/27-3/5	Specialty applicators: greenhouse fumigators		Luis Canas
8	Specialty applicators: soil injection, bait stations		Susan Jones
MIDTERM WORKSHEET and MIDTERM EXAM : both available Friday 3/3 through Friday 3/10			
Part 4: Procedures for evaluating pesticides			
8	Field efficacy testing, part 1: how to interpret results of field trials	Efficacy worksheet (3/5)	Ashley Leach
9 3/6-3/12	Field efficacy testing, part 2: how to conduct testing programs, from an industry perspective		Joe Reed (FMC)
9	Spray coverage testing Residue testing	Coverage and residue worksheet (3/19) Food residue discussion (3/19)	Celeste Welty
SPRING BREAK 3/13-3/17			
10 3/20-3/26	Bioassays for evaluating pesticides; probit analysis	Bioassay worksheet (3/26)	Reed Johnson
10	Evaluating risk to pollinators		Reed Johnson
10	Pesticides in the environment, part 1: pesticide dissemination pathways	Environmental toxicology worksheet (4/2)	Susan Fisher
11 3/27-4/2	Pesticides in the environment, part 2: bioavailability and bioconcentration		Susan Fisher
11	Ecological risk assessment	Since DDT discussion (4/2)	Susan Fisher

Week	Topic	Activity (& due date)	Instructor
Part 5: Use of pesticides within IPM programs			
11	Integrating pesticides into integrated pest management (IPM)	IPM and EIQ worksheet (4/9)	Ashley Leach
12 4/3-4/9	The Environmental Impact Quotient (EIQ) concept		Joe Kovach
12	Pesticide selectivity for beneficial organisms	Non-target toxicity worksheet (4/16)	Reed Johnson
12	Biotechnology in pest management	Herbicide drift and volatilization discussion (4/9)	Kelley Tilmon
13 4/10-4/16	Pesticides in public health programs		Sarah Short
13	Why pesticide applications can fail; factors that mitigate toxicity		Dave Shetlar
13	Pesticide resistance - Overview of theory, mechanisms, and tactics of resistance management		Reed Johnson
14 4/17-4/23	- Mechanisms of fungicide resistance; case studies		Melanie Ivey
14	- Mechanisms of herbicide resistance; case studies		Kent Harrison
14	'Crop Profiles' for information on pesticide use	Crop profiles and scientific literature worksheet (4/23)	Reed Johnson
15 4/24	Recent developments in pesticide application technology; innovations for precision spraying		Erdal Ozkan
15	Pesticides and the future; trends in pesticide use		Reed Johnson
FINAL WORKSHEET and FINAL EXAM : both available Wednesday 4/27 through Sunday 5/1			