

**ENTOMOLOGY 5610
GREENHOUSE PLANT HEALTH AND PEST MANAGEMENT
ONLINE
COLLEGE OF FOOD, AGRICULTURAL AND ENVIRONMENTAL SCIENCES (FAES)
AUTUMN 2022**

Level: Upper level undergraduate and graduate students

Instructor: Dr. Luis Canas

Dr. Canas

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Office hours are by appointment

Class location:

Online

Class days and times:

Self-paced, but times and dates for discussion will be arranged with the class.

Course description:

Overview of the principles of plant health and pest management applied to the production of plants and other commodities in controlled environments, including greenhouses, urban vertical agriculture, high tunnels, hydroponic systems and interiorscapes.

Course credits:

3

Course objectives:

- 1- Understand the main pests' challenges when growing plants and other commodities in controlled environments.
- 2- Understand the use of plant health and ecological concepts in the development and application of integrated pest management (IPM) in controlled environments.
- 3- Gain an appreciation of the different approaches necessary to maintain plant health in different controlled environment settings.

Course structure:

Lectures: For this class the lectures will be recorded and will be made available via computer through Carmen (<https://carmen.osu.edu/>). The topics are listed in the syllabus. The lectures and exercises have the equivalent of the material that would be presented on two 75-minute classes per week. Therefore, please plan accordingly to spend adequate time viewing the lectures. Material will be added to Carmen Wednesday each week.

Exercises and assignments: Assignments and exercises will be provided throughout the duration of the class. These will be posted on Carmen and will explicitly show the due date. When possible, examples and/or rubric or guidelines will be made available. All assignments and exercises need to be submitted using Carmen drop boxes that will be set up for such purpose. Please plan on submitting these in an appropriate format (Word, Excel, pdf). Each assignment will have suggestions regarding accepted formats for submission.

Computer access requirements:

- Students must have access to the internet to access required course materials posted on Carmen.
 - OSU's Carmen site is an education tool that allows interaction between instructors and students and helps to share information about courses. Carmen can be found at: <https://carmen.osu.edu>
 - The syllabus, lectures, partial lecture notes, assignment descriptions, review materials, quizzes or exams, and other class information are posted on Carmen.
 - Usually Chrome (PC), Firefox (PC), and Safari (MAC) have worked well with Carmen. Please check on Carmen webpages for additional information.
 - For weekly discussions we may also use the platform Flipgrid (<https://flipgrid.com/d1fed72d>).
- For live discussion we will use Zoom (<https://carmenzoom.osu.edu>). Links to Zoom will be added to Carmen. When first using Zoom, please make sure you connect with sufficient time to resolve any issues.

Course technology

For help with your password, university e-mail, Carmen, or any other technology issues, questions, or requests, contact the OSU IT Service Desk. Standard support hours are available at <https://ocio.osu.edu/help>, and support for urgent issues is available 24x7.

Self-Service and Chat support: <http://ocio.osu.edu/selfservice>

Phone: 614-688-HELP (4357)

Email: 8help@osu.edu

TDD: 614-688-8743

Baseline technical skills necessary for online courses

Basic computer and web-browsing skills

Navigating Carmen

Technology skills necessary for this specific course

Zoom, audio, and video chat

Preparing presentation using Power Point or similar

Necessary equipment

Computer: current Mac (OS X or better) or PC (Windows 7+ or better) with high-speed internet connection

Webcam: built-in or external webcam, fully installed

Microphone: built-in laptop or tablet mic or external microphone; headset is preferred

Cell phone (for live meetings only): in the event you experience sound issues because of the speed of your internet connection, you will be able to connect using your cellphone (through Zoom). However, these are toll calls, and it would be best if you use the cellphone when you have an unlimited nationwide call plan.

Grading:

There will be weekly quizzes, assignments, an oral presentation, and a final project. Class participation will take two forms: participation in discussions each week and participation in live discussions using Zoom (dates will be added in Carmen). A specific rubric will be provided in Carmen to explain project requirements. Point totals are summarized below:

Item	Points	% of total
Lecture quizzes (N=12, each 10 points)	120	27
Assignments or exercises (N=10, each 10 points)	100	23
Oral presentation	50	11
Class discussion (N=14, each 10 points, drop 2 lowest)	120	27
Final project	50	11
Total	440	100

Lecture quizzes and assignments missed for legitimate reasons (illness, etc.) must be made up before the next quiz or assignment or (in the case of the final project) before the end of the second week of the following term.

As a 5000-level course, ENTMLGY 5610 serves both undergraduate and graduate students. There will be no differential expectations in work required or grading between undergraduate and graduate students.

Grades will be assigned according to the following scale:

Percentage		Points		Grade
93	more	409	more	A
90	< 93	396	409	A-
87	< 90	383	396	B+
83	< 87	365	382	B
80	< 83	352	365	B-
77	< 80	339	352	C+
73	< 77	321	338	C
70	< 73	308	321	C-
67	< 70	295	308	D+
60	< 67	264	294	D
less	< 60	less	264	E

Lecture quizzes:

Some lectures will be associated with a quiz that must be taken using Carmen. The quiz will open at the same time as the lecture and will remain open for a week. The deadlines will be posted on Carmen. Please make sure to take the quizzes at an appropriate time before the deadline.

Assignments or Exercises:

Students will receive assignments based on the material taught during the lectures. Each assignment will be posted on Carmen and will have details about deadlines. The assignments should be submitted electronically using Carmen using the corresponding drop box.

Oral presentation:

A specific rubric for the oral presentation will be posted on Carmen. The goal of this presentation is to help the student understand how to support/refute ideas based on findings from searches from primary literature about integrated pest management. The presentation will be done using Zoom. Students will prepare their oral presentation using PowerPoint or similar and will connect with Dr. Canas at an agreed time. Once in Zoom, students will be able to give their presentation.

Final project:

A rubric for the final project will be posted on Carmen the 3rd week of classes. The goal of this project is to help the student understand how to develop a step by step guideline to start a biological control program.

Textbook:

Not required

Other References (optional):

- 1) Radcliffe's IPM World Textbook (on-line): <http://ipmworld.umn.edu/>
- 2) Ep Heuvelink. 2018. Tomatoes. Wageningen University & Research, The Netherlands Imprint Wallingford, Oxfordshire, UK : CABI, 2018. <https://library.ohio-state.edu/record=b8462830~S8>
- 3) Horst, R. Kenneth. 2013. Field manual of diseases on garden and greenhouse flowers. Dordrecht; New York: Springer. <https://library.ohio-state.edu/record=b7353260~S8>
- 4) Tongxian Liu, Le Kang. 2011. Recent advances in entomological research: from molecular biology to pest management. Beijing: Higher Education Press; Heidelberg; New York: Springer. <https://library.ohio-state.edu/record=b7014277~S8>

GENERAL POLICIES:

Late Policy:

An assignment that is handed in late will be reduced in value 10 percent per day that it is late.

Incomplete Grade Policy:

Incomplete grades will be given only in special circumstances as outlined in university policy.

<http://trustees.osu.edu/rules/university-rules/chapter-3335-8-instruction.html>

Academic Integrity Policies for this online course

- **Quizzes and exams:** You must complete the lecture quizzes and exams yourself, without any external help or communication.
- **Written assignments:** Your written assignments, including discussion posts, should be your own original work. I will provide examples of how to cite references, however if you use reference software such as Endnote you should use the Journal of Economic Entomology style (<http://endnote.com/downloads/styles>). You are encouraged to ask a trusted person to proofread your assignments before you turn them in--but no one else should revise or rewrite your work.
- **Reusing past work:** In general, you are prohibited in university courses from turning in work from a past class to your current class, even if you modify it. If you want to build on past research or revisit a topic you've explored in previous courses, please discuss the situation with me.
- **Falsifying data or results:** All exercises you will do in this course are intended to be learning experiences; you should never feel tempted to make up data or your library research look more successful than it was.
- **Collaboration and informal peer-review:** The course includes opportunities for formal collaboration and discussion with your classmates. While study groups and peer-review of major written projects is encouraged, remember that comparing answers on a quiz or assignment is not permitted. If you're unsure about a particular situation, please feel free just to ask ahead of time.

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*, 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." <https://studentlife.osu.edu/resources/> and search for code of student conduct.

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:

- The Committee on Academic Misconduct web pages ([COAM Home](#))
- *Ten Suggestions for Preserving Academic Integrity* ([Ten Suggestions](#))

Eight Cardinal Rules of Academic Integrity (<https://www.northwestern.edu/provost/policies-procedures/academic-integrity/cardinal-rules.html>)

Special Needs and Accommodations:

Any student who feels he or she may need an accommodation based on the impact of a disability should contact the instructor privately to discuss your specific needs. Please contact the Office for Disability Services at 614-292-3307 (Fax: 614-292-4190; VP: 614-500-4445; Email: slds@osu.edu) in room 098 Baker Hall, 113 W. 12th Ave. Columbus, OH 43210 to coordinate reasonable accommodations for students with documented disabilities. <http://slds.osu.edu/>

Accessibility of course technology

This online course requires use of Carmen (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 with your instructor.

- [Carmen \(Canvas\) accessibility](#)
- Streaming audio and video
- Synchronous course tools

General Information:

Additional information on general Ohio State University Policies can be found at: <https://trustees.osu.edu/bylaws-codes-rules>

Feedback and response time:

I am providing the following list to give you an idea of my intended availability throughout the course. (Remember that you can call 614-688-HELP at any time if you have a technical problem.)

Grading and feedback: For large weekly assignments, you can generally expect feedback within 7 days.

E-mail: I will reply to e-mails within 24-48 hours on school days.

Discussion board: I will check and reply to messages in the discussion boards every 24-48 hours on school days.

Discussion and communication guidelines

The following are my expectations for how we should communicate as a class. Above all, please remember to be respectful and thoughtful. There will be two types of discussion: weekly discussions using Carmen, and live discussions using Zoom.

- **Weekly discussion using Carmen discussion board:** Participation in class discussions is mandatory (see grading). I will expect each student to post at least two comments on each week's discussion board. These could be questions or comments in response to a question or comment. In addition, I will prepare a schedule during the first week of class when a particular student(s) will be the leader(s) of the discussion for that week. As leader of the discussion, the student will be in charge of initiating the discussion if needed, or to stimulate the discussion to continue. I will provide an example during the first week. Write your comments 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. For some discussions we may use Flipgrid (<https://flipgrid.com/d1fed72d>). I will provide instructions during the first week of class about the use of this tool.
- **Live discussions via Zoom (scheduled, see syllabus):** I will expect each student to participate in live discussions (3 in total). The time will be selected during the first week. The students will connect using Zoom (specific details will be posted on Carmen) and will discuss issues relevant to the class. Here you will have a chance to ask any questions you may have about the course. The discussion will last 20 minutes.
- **Tone and civility:** Let us maintain a supportive learning community where everyone feels safe and where people can disagree amicably. Remember that sarcasm does not always come across online.
- **Citing your sources:** When we have academic discussions, please cite your sources to back up what you say. (For the textbook or other 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.

Safe and Healthy Buckeyes (include also on your Carmen site):

Health and safety requirements: All students, faculty and staff are required to comply with and stay up to date on all university safety and health guidance (<https://safeandhealthy.osu.edu>), which includes wearing a face mask in any indoor space and maintaining a safe physical distance at all times. Non-compliance will result in a warning first, and disciplinary actions will be taken for repeated offenses."

Disability Accommodations (with COVID19 language):

The university strives to make all learning experiences as accessible as possible. 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. 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. After registration, make arrangements with me as soon as possible to discuss your accommodations so that they may be implemented in a timely fashion. SLDS contact information: slds@osu.edu; 614-292-3307; slds.osu.edu; 098 Baker Hall, 113 W. 12th Avenue.

Counseling and Consultation Services/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 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.

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 <https://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://cm.maxient.com/reportingform.php?OhioStateUniv&layout_id=13.

Schedule for ENT 5610 (GREENHOUSE PLANT HEALTH AND PEST MANAGEMENT), online.

Week	Topic	Lecture Quizzes	Discussions and Assignments
1	Introduction to Plant Health and IPM; Growing crops in greenhouses – Current Challenges	Quiz 1	Discussion 1 – introduction and current challenges
2	Sampling and identifying pests in greenhouses Creating a pest management plan – prevention is key	Quiz 2	Discussion 2 – Sampling and identification Assignment 1: steps to identify problems Live discussion 1; Wednesday August 31 at 8:00 PM EST via Zoom Link will be provided in Carmen
3	Biological control in greenhouses – Basics Biological control in greenhouses – Developing a program	Quiz 3	Discussion 3 – Examples of biological control agents in action (videos) Assignment 2: Developing a biological control plan
4	Pesticide uses in greenhouses – Mode of Action Pesticide uses in greenhouses – Developing a rotation program	Quiz 4	Discussion 4 – Mode of action and use of pesticides (video) Assignment 3: Developing a rotation program
5	The economics of pest management – How to plan your program The economics of pest management – How to evaluate your program	Quiz 5	Discussion 5 – Evaluating costs of pest management programs Assignment 4: examples to calculate costs
6	Main Insect Pests and Their Management - Thrips - Aphids	Quiz 6	Discussion 6 – Examples of problems caused by thrips and aphids Assignment 5: find papers about thrips and aphid management
7	Main Insect Pests and Their Management - Mites - Whiteflies	Quiz 7	Discussion 7 – discussion of problems caused by mites and whiteflies Assignment 6: find paper about mites and whitefly management Live discussion 2: Wednesday October 5 at 8:00 PM EST via Zoom

Week		Lecture Quizzes	Discussions and Assignments
8	<p>Main Insect Pests and Their Management</p> <ul style="list-style-type: none"> - Mealybugs - Fungus gnats and other organisms 	Quiz 8	<p>Discussion 8 – discussion of video problems caused by mealybugs and fungus gnats</p> <p>Assignment 7: find paper about mealybugs and fungus gnat management</p>
9	<p>Case Studies: Plant Nutrition and Greenhouse Climate for Plant Health</p> <ul style="list-style-type: none"> - Dr. Chieri Kubota <p>Case Studies: Pest management in controlled environments</p> <ul style="list-style-type: none"> - Mushrooms 	Quiz 9	<p>Discussion 9 – discussion of video of management of plant nutrition and greenhouse climate</p> <p>Assignment 8: find paper about current management practices on mushroom production</p>
10	<p>Case Studies: Pest management in vegetables produced in greenhouses – Hydroponic tomatoes</p> <p>Case Studies: Pest management in vegetables produced in greenhouses – Hydroponic lettuce</p>	Quiz 10	<p>Discussion 10 – discussion of video of management of pests on vegetable greenhouses</p> <p>Assignment 9: find paper about current management practices on vegetable greenhouses</p>
11	<p>Case Studies: Pest management in ornamentals produced in greenhouses – Gerberas and Pansies</p> <p>Case Studies: Pest management in vegetables produced in greenhouses – Chrysanthemums and poinsettias</p>	Quiz 11	<p>Discussion 11 – discussion of video or paper management of pests in ornamental greenhouses</p> <p>Assignment 10: find paper about current management of pests in ornamental greenhouses</p> <p>Live discussion 3: Wednesday November 2 at 8:00 PM EST via Zoom</p>
12	<p>Case Studies: Pest management in in greenhouses - Hemp 1</p> <p>Case Studies: Pest management in in greenhouses - Hemp 2</p>	Quiz 12	<p>Discussion 12 – discussion of video of management of pests on hemp greenhouses</p>
13	<p>Presentations – Dr. Luis Canas will provide access to recording via Zoom</p>		<p>Discussion 13 – comments about presentations</p> <p>Oral presentations (recorded)</p>
14	<p>Thanksgiving week – no class</p>		
15-16	<p>Presentations – Dr. Luis Canas will provide access to recording via Zoom</p>		<p>Discussion 14 – comments about presentations</p> <p>Oral presentations (recorded)</p> <p>Final project due</p>

17	Final Exams Week		
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