Syllabus – *Insect Ecology*
University of Maryland - College Park

ENTM 612
Spring 2023

Course Overview and Organization

INSECT ECOLOGY is 3-credit, advanced course in population and community ecology, plant-insect interactions, insect biodiversity and biogeography, and applied ecological entomology, with shared emphases on both classical and current advances in ecological & entomological science. Current trends in ecological entomology research will be framed in terms of classical, quantitative, and conceptual theory. We will survey: individual insect adaptations and life history strategies in response to abiotic and biotic drivers; geographic distribution and population dynamics of species; interactions among species, food web dynamics, and emergent structure of diverse communities; and reciprocal interactions with ecosystems. Applications include lessons for/from pest management, biological control, vector control, and biodiversity management in agroecosystems, forestry, urban systems, and other managed systems.

I expect students to take an active role in learning, and the course design offers considerable flexibility in support. The course will meet IRL with interactive lectures, supplemented with online Zoom meetings for six student group-led discussions of the primary literature (Feb 9, Feb 23, Mar 14, Apr 6, Apr 25, May 11 – see schedule below). Term papers will benefit from a robust peer review process, and both mid-term and final exams will be take-home with open notes. Using this dual modality in-person and online, you will engage and collaborate with other students and the instructor on a regular basis.

Learning Outcomes

After completing this course, students should be able to:

1. Recognize and provide examples of the important role of natural history within the discipline of insect ecology;
2. Communicate the role insects and kin have played in the historical development and testing of ecological theories;
3. Analyze the quantitative dimensions of insect ecology;
4. Critically assess and objectively critique the primary scientific literature on insect ecology;
5. Integrate basic ecological concepts relating to insects and their relatives with their applications for management and pest control.

Dr. Daniel Gruner (he/him)
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Synchronous Class
Tuesday & Thursday
12:30 p.m. – 1:45 p.m.
Plant Sciences 1115 & Zoom

Website
https://elms.umd.edu/

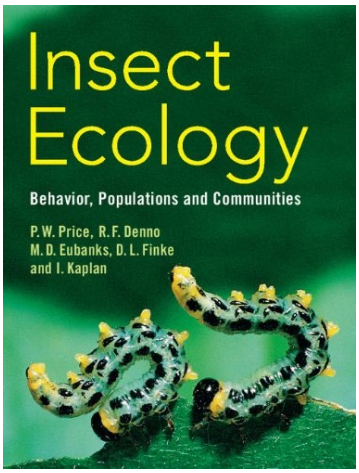
Zoom Office Hours
Mon 11-12, Thur 2-3
Or by appointment

Optional Text
Price et al. 2011. Insect Ecology: Behavior, Populations and Communities. Cambridge University Press

Prerequisites
- No requirements
- Recommended: undergraduate level ecology, entomology, calculus, statistics

Communication
- ELMS email system
- Office hours
- By appointment

Resources and Classroom Tech



Course materials, Zoom links, access to media, quizzes, and discussions will be provided on ELMS-Canvas, accessible via **elms.umd.edu** (**https://umd.instructure.com/courses/1339669**). The optional text will be useful to you, as much of the course structure is modeled upon it, with chapter readings indicated in the Course Schedule below: **Price et al. 2011. Insect Ecology: Behavior, Populations and Communities** (Cambridge University Press, ISBN 978-0521542609). Used or rental copies are widely available. Reading lists will be provided for each unit with supplemental readings from the primary literature available on **Endnote Web**. Any required readings will be posted on ELMS-Canvas well in advance: please have literature readings completed by the indicated dates and prior to the relevant discussion sections.

We will use **Zoom** to connect for synchronous, student-led group discussions of the primary literature (see schedule). If circumstances compel changes in campus policies on COVID-19 or if inclement weather forces changes to the class schedule, we reserve the flexibility to use Zoom. Prior to convening in Zoom, you need to authenticate by logging into **https://umd.zoom.us/** (or with your Zoom account at your own university) or by clicking on the Zoom session through the course ELMS page. By authenticating you can join the session without the need to admit you manually. I assume all are well aware of Zoom Netiquette. We will start class promptly. Lectures will be captured and recorded with **Panopto** and posted on ELMS-Canvas within 1 day after class. As I expect breakout rooms will be used, Zoom discussions will not be recorded.

Course Components

I. Exams: There will be two [2], primarily essay-based, open notes/book exams (100 pts each). The midterm will cover units 1 & 2, and the final exam will cover units 3 & 4 (see schedule below). The final exam will not be explicitly cumulative, although knowledge of foundational topics is expected. Exams will be available prior to the due date, which can be re-scheduled only with campus-approved absences (i.e., religious observances, mandatory military obligation; illness of the student or illness of an immediate family member; participation in university activities at the request of university authorities; or other compelling circumstances beyond the student's control). Exams will integrate content and ideas from lecture, assigned readings, and discussion papers. For lectures, PDF handouts, outlines, presentation summaries, and supplementary resources will be posted on the class ELMS-Canvas no later than the evening prior to lecture, and the Panopto capture of Zoom sessions will be rendered and posted same day.

II. Review Paper: Students will prepare a concise review paper on a current topic in insect ecology (150 pts total). Students will choose a topic and initially prepare a high-quality draft for internal peer review by two of their colleagues. Each student will prepare two anonymous reviews, and each student will then revise their own paper according to reviews received. The final, revised paper will be submitted along with a cover letter describing the changes made (or not made) in response to the reviews. Because late drafts or peer reviews impact your peers, all term paper assignments will be penalized 5% for each business day they are late.

First drafts should be double-spaced, continuously line-numbered, and in the range of 10-15 pages, not including figures or references. Use primary literature and in-text citations to support your arguments, formatted consistently according to the bibliographic style of any relevant entomological or ecological journal. The paper must use at least fifteen [15] citations to primary peer-reviewed published literature, at least six [6] of which should be dated 2017 or later (more citations welcome). Papers will be assessed for their

incorporation of reviewer comments, their clarity, strength of the argument and narrative, scientific content, use of key insect ecology concepts, and use of relevant literature. Peer reviews will be assessed for their critical insight according to a rubric that will accompany the assignment. You may leverage this assignment as advance work on your thesis, for example the introduction or a chapter devoted to synthesis. You are invited to include data collection and analysis if you so choose – please let me know so that I can facilitate or help. Try to limit your final paper to ***about 3000 words*** [5-6 pages, 12 point font, 1-inch margins, single-line spacing]. References and optional figures or tables are not counted in the rough wordcount.

III. Discussion: There will be six (6) student-led discussion sessions on Zoom in which we will synthesize historical and current primary literature (50 points total). Participation is essential. For each session, up to five [5*6 = 30] points will be awarded for attendance and participation. I will not nickel & dime your participation, judge the "quality" of your questions, or score you higher for more frequent or higher volume input. For full credit, I simply expect you to prepare, engage, and interact. Two to three students will lead and stimulate each discussion – all students will participate in leading one discussion and can earn up to twenty [20] points for their preparation, summary, and questions for discussion. Discussion leaders will work with Dr. Gruner to select topical papers of broad significance, typically using one or more seminal classic along with more recent advance(s). At least five days prior to discussion, leaders will prepare a capsule summary and discussion questions to be posted on the Discussion Forum on the course space on **ELMS-Canvas**. These summaries should be phrased in your own words, and they should include penetrating comments and questions to motivate the discussion. **Attendance for discussions is required, and no late discussion summaries will be accepted** without advance approval for excused absences.

Grades and Grading

Your final plus/minus letter grade will be based on the accumulation of numeric scores (total = 400 points) based upon the following breakdown:

Midterm Exam	**100**
Final Exam	**100**
Term Paper (Literature Review)	**150**
○ First Draft (10)	
○ Peer Review (15 x 2 = 30)	
○ Cover Letter: Response to Reviews (10)	
○ Final Draft (100)	
Literature Discussions	**50**
○ Participation (6 x 5 = 30)	
○ Leadership (20)	

There will be no curve on final grades, although for numerically borderline cases I will round up to the nearest whole number. I do expect primarily A's and B's for graduate-level work. All scores will be posted to the gradebook in ELMS-Canvas. We will use the following grading percentile scale:

A+	100-98%	B+	89-87%	C+	79-77%	D+	69-67%		
A	97-93%	B	86-83%	C	76-73%	D	66-63%	F	<60%
A-	92-90%	B-	82-80%	C-	72-70%	D-	62-60%		

Course Schedule ("Chapters" refers to optional text, Price et al. 2011)

Lect#	Date	Topic	Chapters
1	26-Jan	Introduction: Ecological Importance of Insects & Kin	1
		UNIT 1: Plant—Herbivore Interactions	
2	31-Jan	Plants as Heterogeneous Resources for Herbivores	4.1-4.2
3	2-Feb	Pattern and Theory of Plant Defense	4.3-4.4
4	7-Feb	Herbivore Adaptations, Behavior and Distributions	4.5
	9-Feb	**Discussion #1 (2-4) Zoom**	
5	14-Feb	Herbivore Diet Breadth Evolution & Co-Evolution	4.6, 8.8
		UNIT 2: Predator—Prey Interactions	
6	16-Feb	Predator Behavior and Insect Defense	2.7, 7.1-7.2, 7.7-7.8, 8.11
7	21-Feb	Multitrophic Interactions: Plant Mediation of Predation	4.6, 7.7, 13.2
	23-Feb	**Discussion #2 (5-7) Zoom**	
8	28-Feb	Predation: Functional & Numerical Responses	7.3-7.4
9	2-Mar	Population Growth & Dynamics	7.5, 9.1-9.2
10	7-Mar	Predator-Prey Population Regulation ***** Term Paper Assigned***	11.1-11.5
11	9-Mar	Stability, Persistence of Predator-Prey Interactions & Biological Control	7.6, 7.appl
	14-Mar	**Discussion #3 (8-11) Zoom**	
	16-Mar	**MIDTERM EXAMINATION DUE (no class)**	
	21-Mar	Spring Break	
	23-Mar	Spring Break	
		UNIT 3: Evolution of Life Histories & Insect Societies	
12	28-Mar	Life History Evolutionary Theory	10
13	30-Mar	Mating Systems, Parental Investment & Sexual Selection	2.8
14	4-Apr	Structure and Evolution of Insect Societies	3
	6-Apr	**Discussion #4 (12-14) Zoom** ***** First Draft Term Paper Due***	
		UNIT 4: Communities, Ecosystems, and Macroecology	
15	11-Apr	Competition, Coexistence, Resource Partitioning & the Niche	5, 12.2
16	13-Apr	Positive Interactions: Mutualisms & Pollination	6
17	18-Apr	Parasites, Pathogens & Insects as Vectors ***** Term Paper Peer Reviews Due***	8
18	20-Apr	Food Webs and Trophic Cascades	12.4, 12.7, 13.3
	25-Apr	**Discussion #5 (15-18) Zoom**	
19	27-Apr	Insect Community Structure & Development	12
20	2-May	Biogeography & Macro Patterns of Diversity ***** Final Term Paper Due***	14
21	4-May	Insect Diversity & Ecosystem Functions	7.6, 15.3
22	9-May	Global Change & 'Insect Apocalypse'	15
	11-May	**Discussion #6 (19-22) Zoom**	
	13-May	**FINAL EXAMINATION DUE (no class)**	

Campus Policies

Please visit the **Graduate School's list of campus-wide academic policies** and follow up if you have questions. It is our shared responsibility to know and abide by the University of Maryland's policies that relate to all courses, which include the following topics:

- Academic integrity
- Attendance and excused absences
- Accessibility and accommodations
- Grades and appeals
- Student and instructor conduct
- Copyright and intellectual property

Course-Specific Policies

Academic Integrity. At all times, students must adhere to the **UMD Code of Academic Integrity** and the student-generated **Honor Pledge**. We follow University policy regarding academic dishonesty, which includes plagiarism, cheating, fabrication, and facilitating academic dishonesty. The use of generative AI, such as GPT-3 or other similar tools, is strictly prohibited in this course. All work submitted must be the original work of the student, and the use of such tools undermines the integrity of the assignment and the educational process. A significant percentage of plagiarism cases are unintentional, therefore it is the responsibility of students to understand plagiarism and take steps to avoid it. Violations of the academic integrity policy can result in a failing grade for the class with an indication of academic dishonesty noted on the transcript. **Academic dishonesty will not be tolerated**.

Names/Pronouns and Self Identifications. The University of Maryland recognizes the importance of a diverse student body, and we are committed to fostering inclusive and equitable classroom environments. I invite you, if you wish, to tell us how you want to be referred to both in terms of your name and your pronouns (he/him, she/her, they/them, etc.) in your ELMS profile and/or your Zoom profile. The pronouns someone indicates are not necessarily indicative of their gender identity. Visit **trans.umd.edu** to learn more. Additionally, how you identify in terms of your gender, race, class, sexuality, religion, and dis/ability, among all aspects of your identity, is your choice whether to disclose (e.g., should it come up in classroom conversation about our experiences and perspectives) and should be self-identified, not presumed or imposed. I will do my best to address and refer to all students accordingly, and I ask you to do the same for all your colleagues.

Communication with Instructor. Email: If you need to reach out to me about personal, academic, or intellectual concerns/questions, please email using the ELMS-Canvas inbox (preferred) or by standard email, while identifying yourself and the course in which you are enrolled. I will send important announcements via ELMS-Canvas messaging. Please enable your email & announcement notifications (including changes in assignments and/or due dates) in ELMS-Canvas so you do not miss any messages. You are responsible for checking your email and ELMS-Canvas inbox with regular frequency.

Communication with Peers. With a diversity of perspectives and experience, we may disagree with one another. As such, it is important that we conduct ourselves in a professional manner and that we work together to foster and preserve a classroom environment in which we can respectfully discuss controversial questions. I encourage you to confidently exercise your right to free speech—bearing in mind, of course, that this course is NOT the space for hate speech, harassment, and derogatory language. I will make every reasonable attempt to create an atmosphere in which each student feels comfortable voicing their argument without fear of being personally attacked, mocked, demeaned, or devalued. Any behavior (including harassment, sexual harassment, and racially and/or culturally derogatory language) that threatens this atmosphere will not be tolerated. Please

alert me immediately at any point during our semester if your engagement has been in some way hindered in the learning environment, or consult **resources from the Office of Diversity & Inclusion**.

Resources & Accommodations

COVID-19. We will adhere to campus policies for COVID-19 at all times. General information can be found at the **4Maryland** page. I encourage mask use to prevent transmission. If you test positive or have close contact(s) or potential exposure, please consult the **HEAL Line** for isolation and quarantine information and advice. Notify me as soon as possible if you must be absent from class or discussion.

Accessibility and Disability Services. The University of Maryland is committed to creating and maintaining a welcoming and inclusive educational, working, and living environment for people of all abilities. The University of Maryland is also committed to the principle that no qualified individual with a disability shall, on the basis of disability, be excluded from participation in or be denied the benefits of the services, programs, or activities of the University, or be subjected to discrimination. The **Accessibility & Disability Service (ADS)** provides reasonable accommodations to qualified individuals to provide equal access to services, programs and activities. ADS cannot assist retroactively, so it is generally best to request accommodations several weeks before the semester begins or as soon as a disability becomes known. Any student who needs accommodations should contact me as soon as possible so that I have sufficient time to make arrangements.

For assistance in obtaining an accommodation, contact Accessibility and Disability Service at 301-314-7682, or email them at **adsfrontdesk@umd.edu**. Information about sharing your accommodations with instructors, note taking assistance, and more is available from the ADS site.

Student Resources and Services. Taking personal responsibility for you own learning means acknowledging when your performance does not match your goals and doing something about it. I hope you will come talk to me so that I can help you find the right approach to success in this course, and I encourage you to visit **UMD's Student Academic Support Services website** to learn more about the wide range of campus resources available to you. In particular, everyone can use some help sharpen their communication skills (and improving their grade) by visiting **UMD's Writing Center** and schedule an appointment with the campus Writing Center. If it would be helpful to have someone to talk to, visit **UMD's Counseling Center** or consult one of the many other **mental health resources on campus**.

Basic Needs Security. If you have difficulty affording groceries or accessing sufficient food to eat every day, or lack a safe and stable place to live, please visit **UMD's Division of Student Affairs website** for information about resources the campus offers you and let me know if I can help in any way.

Course Evaluation. Please submit a course evaluation through Course Experiences in order to help faculty and administrators improve teaching and learning at Maryland. All information submitted to CourseEvalUM is confidential. Campus will notify you when the website is open for you to complete your evaluations for fall semester courses. Please go directly to **Course Experiences** to complete your evaluations. By completing all of your evaluations each semester, you will have the privilege of accessing through **Testudo**, the evaluation reports for the thousands of courses for which 70% or more students submitted their evaluations.