



ENVS*4070 Pollinator Conservation

Winter 2019

Section(s): C01

School of Environmental Sciences

Credit Weight: 0.50

Version 1.00 - January 16, 2019

1 Course Details

1.1 Calendar Description

This course will explore the ecology of pollination with an emphasis on the roles animals play in pollen movement. Students will critically examine hypothesized drivers of regional, national and global pollinator declines, and the range of potential strategies suggested to mitigate or reverse these declines. Students will examine the efficacy of a wide range of pollinator conservation strategies in different geographical, ecological and economic contexts to help them build an understanding of the available toolbox for conservation.

Pre-Requisite(s): BIOL*3130

1.2 Course Description

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1.3 Timetable

Tuesday & Thursday, 1130-1250, CRSC, Room 117

1.4 Final Exam

Final exam is scheduled for Monday 15th April at 08:30. Venue yet to be confirmed. Exam time and location are subject to change. Please see WebAdvisor for the latest information.

2 Instructional Support

3 Learning Resources

3.1 Required Resource(s)

Required Articles (Article)

The course content will draw heavily on peer-reviewed and grey literature sources. Where these are used full citation information will be provided in lectures to allow students to access these sources.

No textbook is required reading, but recommended texts contain information highly relevant to the course and related topics.

3.2 Recommended Resource(s)

Recommended Text Books (Textbook)

Dicks, L. V., D. A. Showler and W. J. Sutherland (2010). Bee Conservation: Evidence for the Effects of Interventions. Pelagic Publishing. ISBN 978-1-907807-00-8

Mader, E., M. Shepherd, M. Vaughan, S. H. Black and G. LeBuhn (2011). Attracting Native Pollinators: the Xerces Society Guide. Storey Publishing. ISBN 978-1-60342-695-4

Mader, E., J. Hopwood, L. Morandin, M. Vaughan and S. H. Black (2014). Farming with Native Beneficial Insects: the Xerces Society Guide. Storey Publishing. ISBN 978-1-61212-283-0

Waser, N. and J. Ollerton (2006). Plant-Pollinator Interactions: from Specialization to Generalization. University of Chicago Press. ISBN 978-0226874005

Willmer, P. (2011). Pollination and Floral Ecology. Princeton University Press. ISBN 978-0691128610

Wilson, J. S. and O. M. Carril (2016). The Bees in your Backyard: a Guide to North America's Bees. Princeton University Press. ISBN 978-0-691-16077-1

4 Learning Outcomes

4.1 Course Learning Outcomes

By the end of this course, you should be able to:

1. Define and describe the process of pollination, its importance for plant reproduction, the maintenance of wild plant biodiversity and crop production.
2. Describe using correct taxonomic names the diversity of flower visiting animals and pollinators, and how their behaviour and ecology influence floral traits and plant ecology.
3. Explain how interspecific interactions can affect the structure of plant-pollinator communities through processes such as competition, facilitation and mutualism.
4. Describe the evidence suggesting pollinator declines around the world, and analyze the shortcomings of these data sets and hence our ability to predict future trends.
5. Explain how the key hypothesized drivers of declines could be affecting pollinator populations, and how these drivers might interact. Evaluate how the relative importance of drivers of decline might differ among key pollinator taxa.
6. Explain how environmental risks to pollinators are currently assessed and reported, and how these processes might be improved in future using current scientific literature.
7. Discuss the efficacy, and analyze the cost effectiveness, of pollinator conservation strategies around the world. Describe how the success of such schemes might be enhanced in the future.
8. Explain, with specific examples, how policy engagement at regional, national and international levels can have positive (and negative impacts) on pollinator conservation.

5 Teaching and Learning Activities

5.1 Lecture

Topic(s):

Topic 1: What is pollination, and why is it important for plant reproduction, maintenance of wild plant biodiversity and crop production?

Topic 2. Survey the diversity of pollinators, ranging

from specialist to generalist, and introduce pollination syndromes and functional guilds.

Topic 3. Pollinator behaviour – how foraging behaviour influences pollen transfer.

Topic 4. Plant-pollinator communities, competition for pollination, facilitation and pollination networks.

Topic 5. The evidence supporting global pollinator declines, and overview of the drivers of declines.

Topic 6. Land use change and agricultural intensification as drivers of pollinator declines.

Topic 7. Parasites, pathogens and invasive species as drivers of pollinator declines.

Topic 8. Climate change and interacting impacts of multiple drivers of pollinator declines.

Topic 9. How are environmental risks to pollinators currently assessed and reported, and how might these be improved?

Topic 10. Assessing the efficacy and cost effectiveness of pollinator conservation strategies around the world: how can the success of such schemes be enhanced?

Topic 11. How can policy engagement at regional, national and international levels effect positive change for pollinator conservation?

6 Assessments

6.1 Assessment Details

Midterm examination (25%)

Date: Tue, Feb 26, 11:30 AM, CRSC, Room 117

Exam duration 75 minutes (15 minutes reading time, plus 60 minutes writing time).

Candidates are expected to answer 3 of 5 long answer questions.

Pollinator Conservation Management Plan (35%)

Due: Mon, Mar 18, 11:59 PM

Each student will write a specific conservation management plan to address a specific pollinator conservation management goal they have identified. Detailed instructions and advice on researching and preparing this assessment are provided separately via CourseLink.

Group oral presentation (15%)

Date: Week 9, CRSC Rm 117

Students will prepare and deliver a group presentation that outlines and critically evaluates the evidence for and against a particular pollinator conservation mitigation. Detailed instructions and advice on researching and preparing this assessment are provided separately via CourseLink.

Final examination (25%)

Date: Mon, Apr 15, 8:30 AM, tbc

Exam duration 105 minutes (15 minutes reading time, plus 90 minutes writing time).

Candidates are expected to answer 3 of 5 long answer questions.

7 Course Statements

7.1 Grading Policies

Midterm Examination: Make-up exams for a missed midterm examination will only be granted for medical reasons, documented by a Doctor's note. If you are unwell and unable to sit a midterm examination, you are expected to promptly obtain a Doctor's note and to contact the Instructor as soon as possible regarding the missed exam. An alternate exam time will be established between the Instructor and student, as soon as possible after the original midterm date. If a midterm exam is missed for a non-medical reason, the student will receive a grade of 0 for the missed examination.

Pollinator conservation management plan: Each student will research and write a conservation management plan for pollinators. This is an individual assignment meaning that group work is not permitted.

Late assignments will be penalized 10% per day and will no longer be accepted a week after the due date. If you cannot meet a course requirement, let Professor Raine (email:

nraine@uoguelph.ca) know as soon as possible, before the due date. Extensions will only be granted for medical reasons (documented by a Doctor's note) or for documented compassionate reasons, at the discretion of the Instructor.

Keep paper and/or other reliable electronic back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Group project – oral presentation: Each group member will receive the same mark for the academic quality component of the group presentation, but will be evaluated individually for enunciation, pace, ability to convey scientific information and ability to answer questions. Presentations will be assessed by the course instructor and peer evaluation from the audience.

Attendance at oral presentations is mandatory. A 10% deduction from the group project oral presentation grade will be deducted if you do not attend.

Peer Evaluation - each student will complete a performance evaluation for themselves and for their project partners at the end of the semester in order to encourage equal participation of each group member, and to help ensure that each individual's group project oral presentation mark is a realistic reflection of actual participation and effort. The Peer Evaluation is a quantitative assessment of each person's abilities, participation and contribution to the group and to the process of constructing the research program schematic, group paper and presentation. Peer Evaluations must be honest and fair, and be accompanied by comments to justify the assessment of each individual. The Peer Evaluation will be used at the Instructor's discretion to modify the grade (up to $\pm 10\%$ of the worth of the assignment) of any individual based on their level of contribution and participation in all aspects of the group project. A deduction of 10% will be applied to the group project oral presentation mark of any student that fails to submit evaluations for both themselves and their group members.

7.2 Policy on Group Work

Group work is required only for the group project, which includes group meetings, preparation of group contract and an oral presentation. All group members are expected to participate and contribute equally to the research and oral presentation. Group participation will be evaluated through group peer evaluation. In addition you will be required to peer evaluate presentations made by other groups. All group members are expected to behave professionally and ethically in all group activities. All members of the group are responsible for all content and aspects of the presentation, and may be held responsible for any instances

of academic misconduct in group assignments.

7.3 Requests for deadline extensions or other considerations

If you require an extension for a medical or otherwise legitimate and approved reason, you are to contact the instructor prior to the deadline. All requests made after the deadline will not be considered.

You are expected to save backed up versions of your work (drop box or Google Drive work very well and if you need help in learning how to use these contact course instructors). All requests for consideration made due to a crashing computer (or similar) will not be considered.

You are expected to submit the correct version of your assignments. All requests to resubmit an updated version will not be considered.

You are expected to ensure that your assignments have been correctly uploaded and verified by the courselink drop box system. All requests to resubmit due to a failure to verify will not be considered.

If you are Varsity athlete, or have similar travel commitments during semester, please contact the instructor to discuss implications with regards to missing teaching sessions and concerns around exam and assessment deadlines at least two weeks prior to the event.

7.4 Students with young children

Parental and student responsibilities sometime coincide. That's normal. You are welcome to bring your child/ren to class if your usual arrangements have temporarily fallen through. If you are nursing an infant, you are welcome to attend all classes with that infant. If you are caring for an infant so young that childcare is not possible, you are welcome to bring that infant to all classes.

If you are unable to make arrangement for child care and anticipate having to bring your child/ren to every class, please discuss this situation with the instructor.

In all cases, we ask that you sit at the end of a row of seating, closer to a door so that your departure or arrival does not interfere with others' learning.

8 University Statements

8.1 Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

8.2 When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Academic Consideration and Appeals

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

Graduate Calendar - Grounds for Academic Consideration

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.3 Drop Date

Courses that are one semester long must be dropped by the end of the fortieth class day; two-semester courses must be dropped by the last day of the add period in the second semester. The regulations and procedures for course registration are available in the Undergraduate and Graduate Calendars.

Undergraduate Calendar - Dropping Courses

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>

Graduate Calendar - Registration Changes

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

8.4 Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

8.5 Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared

responsibility between the University and the student.

When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway.

Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability.

Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day.

More information can be found on the SAS website
<https://www.uoguelph.ca/sas>

8.6 Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community—faculty, staff, and students—to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Undergraduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

Graduate Calendar - Academic Misconduct
<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

8.7 Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

8.8 Resources

The Academic Calendars are the source of information about the University of Guelph's

procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs.

Academic Calendars

<https://www.uoguelph.ca/academics/calendars>
