

BIOL347 Plant Biology

S2 Day 2019

Dept of Biological Sciences

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General Information

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Credit points 3

Prerequisites

(39cp at 100 level or above) including (BIOL227 or BIOL210 or BIOL228 or BIOL229 or ENVE266)

Corequisites

Co-badged status

Unit description

This unit draws together elements of plant ecology, evolution and ecophysiology, and will be useful for students with interests at many scales, including plant conservation, ecology, and environmental science. Topics will include: An overview of Australian and global plant communities; Methods for describing and sampling vegetation; Plant functional traits and ecological strategies; Basic physiology of photosynthesis, respiration, nutrient uptake and plant water use; Plant functions and fluxes at landscape-scale; Impact of climate change on plants and communities. Experimental work in glasshouses and fieldwork are important components of the unit. Students will gain experience in data analysis, for which a basic understanding of statistics is mandatory. Students also gain experience in plant identification.

Important Academic Dates

Information about important academic dates including deadlines for withdrawing from units are available at https://www.mq.edu.au/study/calendar-of-dates

Learning Outcomes

On successful completion of this unit, you will be able to:

Explain the factors underpinning major patterns of plant distribution globally and within Australia

Recognise and describe features of major Australian plant families

- Summarise major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- Outline plant morphological and physiological adaptations to major environmental factors (and limitations)

Demonstrate understanding of the role of plant functional traits in plant ecological strategies

Collect, analyse, present and interpret ecophysiological data

General Assessment Information

 All students are required to attend all three days of the On-Campus Session running from Wednesday to Friday, September 25/26/27. • All students are required to attend weekly prac/tutorial classes, and expected to regularly attend lectures.

Assessment for this unit consists of a mixture of quizzes, short prac/tutorial reports, a seminar presentation, a written assignment, and a final exam. Submission of all assessments and completion of all tests is essential for adequate progress, since all assessment tasks are required to master the content of this unit. It will be essential to keep up with the lectures and associated quizzes, and the pracs/tutorials and their associated short reports, as marks accrue throughout the semester.

All assessments will be graded and we will endeavour to have marks available within three weeks of the assessment due date (but sooner, generally). Marks will be available on Gradebook in iLearn. Feedback on the written assignment will be provided through Turnitin when the marks are released.

Quizzes on lecture material

Multiple choice quizzes will be provided to incentivise staying up to date with lecture material. There will be five quizzes throughout the semester (weeks 2, 4, 7, 10, 12), each quiz concentrating on lecture topics covered since the last quiz. Quizzes will open on iLearn on the Wednesday of the relevant week (after the lecture) and close on the Sunday of that week, at midnight. Once you start the quiz you will have 30 minutes to complete it and you are only allowed one attempt. The questions are designed to ensure that you have *some familiarity* with the lecture material. They do not require a deep understanding of the lecture material (deeper understanding will be assessed in the Final Exam, and in the written report associated with the on-campus session). The quizzes will be automatically marked and the marks and correct answers will be released once submissions have been completed.

Short reports on practical classes and tutorials

We will run weekly pracs/tutorials throughout the semester. Attendance at these classes is expected. A short report from five of the classes will require submission through iLearn, one week after the class. These reports are designed to test your knowledge of topics covered in these classes, which will generally coincide with topics covered in lectures. More information on these assessments will be provided as the semester progresses.

Seminar on a journal article

Oral communication is a key part of science. This assessment is designed to test communication skills (as much as the underlying science) by requiring students to give a short talk on a journal article of their choice. Students will be assessed on the seminar content and presentation quality, and their ability to answer questions.

Written assignment:

Students will submit (through Turnitin) a substantial written report related to field/lab work carried out during the September on-campus session. Please use the following list to check your assignment before electronic submission:

• Text is the required length

- · Text has been proof-read and spell-checked
- References are reputable sources, and are cited at appropriate points within the text
- Formatting of references in the text and in the reference list follows the style of *Austral Ecology* journal.
- Assignment is your own work not copied verbatim from reference sources or other students. (see note on plagiarism, below, and the relevant University Policy)

Penalties

5% of the marks for the written assignments will be deducted for each day they are late, and assignments will not be accepted for marking if more than 10 days overdue. Exceptions can be granted by the unit Convenor if there are sufficiently serious medical or other extenuating circumstances (appropriate supporting documentation should be provided, through the University's online system).

Penalties will be applied for reports being noticeably over the word limit, and increasingly so the more over the limit they are.

Plagiarism

Students are required to submit written reports via the plagiarism detection software, Turnitin. This can be accessed on the unit's iLearn website. Your assessment task will be automatically compared to work of your classmates, previous students from Macquarie and other universities, and with material available on the Internet. The results of the analysis will be sent to the unit Convenor. Any evidence of plagiarism will be dealt with following University policy. The penalties imposed by the University for plagiarism are serious and may include loss of marks, referral to a Faculty disciplinary committee, or even expulsion from the University.

Final examination

The final exam will be closed book and three hours duration and held in the official university examination period at the end of the session. The exam will consist of multiple choice-, shortand extended-answer questions. Some multiple choice questions will be drawn from the quizzes made available during the semester. Calculators without text retrieval capacity will be allowed into the exam room.

Assessment Tasks

Name	Weighting	Hurdle	Due
Quizzes on lecture material	10%	No	Weeks 2, 4, 7, 10, 12
Reports on pracs/tutes	15%	No	Weeks 4, 6, 8, 9, 11
Seminar on a journal article	10%	No	25/09/2019
Ecology Reserve report	25%	No	20/10/2019

Name	Weighting	Hurdle	Due
Final examination	40%	No	ТВА

Quizzes on lecture material

Due: Weeks 2, 4, 7, 10, 12 Weighting: 10%

Each quiz will cover lecture topics covered in the preceding couple of weeks. Quizzes will open on iLearn on the Wednesday of the relevant week (after the lecture) and close on the Sunday of that week, at midnight. Once you start the quiz you have 30 minutes to complete it and you are only allowed one attempt. The quizzes will be automatically marked and the marks and correct answers will be released once submissions have been completed.

On successful completion you will be able to:

- Explain the factors underpinning major patterns of plant distribution globally and within Australia
- Recognise and describe features of major Australian plant families
- Summarise major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- Outline plant morphological and physiological adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies

Reports on pracs/tutes

Due: Weeks 4, 6, 8, 9, 11 Weighting: 15%

A short report from five of the classes will require submission through iLearn, one week after the class. Each report will be worth 3% of your final grade (total 15%)

On successful completion you will be able to:

- Summarise major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- Collect, analyse, present and interpret ecophysiological data

Seminar on a journal article

Due: 25/09/2019 Weighting: 10%

Choose a journal article published in the last 5 years on a plant ecology, ecophysiology or vegetation science topic that interests you. During the September on-campus session you are required to present an 8 minute talk (with a further 2 minutes for questions) that is a summary and critical appraisal of the article. Students will be assessed on the seminar content and presentation quality, and their ability to answer questions.

A data projector and laptop will be available for Powerpoint or PDF presentations. Please bring your presentation on a USB drive disk (that has recently been checked for viruses!). Include in your talk:

- The question being addressed in the article and why it is important
- · A description of the methods
- A critical analysis of the results
- An evaluation of the wider implications of their findings.

On successful completion you will be able to:

- Outline plant morphological and physiological adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies

Ecology Reserve report

Due: 20/10/2019 Weighting: 25%

Traits and communities in the Macquarie University Ecology Reserve (Lane Cove National Park)

Submit a report on the field/lab work conducted during the September on-campus session. Full details of this assessment will be given during the on-campus session and in the accompanying prac notes, downloadable at the time from iLearn. Your report should be written in the style of a scientific paper with an Abstract, Introduction, Methods, Results and Discussion. You should also include references cited, figures & tables as appropriate. Word count (maximum; not including Abstract, References, Appendices): **3000 words.** Journal style: *Austral Ecology*.

On successful completion you will be able to:

• Explain the factors underpinning major patterns of plant distribution globally and within Australia

- Recognise and describe features of major Australian plant families
- Summarise major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- Outline plant morphological and physiological adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- · Collect, analyse, present and interpret ecophysiological data

Final examination

Due: **TBA** Weighting: **40%**

Final examination

The final examination will consist of a series of multiple choice, short-answer and long-answer questions that are designed to test understanding of the concepts taught in this course. Length: 3 hours, plus 10 minutes reading time.

On successful completion you will be able to:

- Explain the factors underpinning major patterns of plant distribution globally and within Australia
- · Recognise and describe features of major Australian plant families
- Summarise major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- Outline plant morphological and physiological adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies

Delivery and Resources

Requirements for Practical classes

The work carried out during practical classes is an important and integral part of the course. You must read, download and either print the prac notes to bring to each class, or bring them on a laptop or tablet.

Laboratory requirements

• Notebook and pencils/pens for notes & diagrams

- Laptop, if you have one, with Excel and Word (or open source equivalents)
- USB data stick to transfer data (recently checked with anti-virus software)
- Enclosed shoes (you cannot be present in the lab or field without these)
- No food or drink in University laboratories
- · Please switch mobile phones off

Field requirements

- · Clip board for field sheets
- · Pencils/pens for notes
- Appropriate clothing (walking shoes or boots, rain jacket, sun protection, trousers and long sleeved shirt)
- Water bottle and lunch/snacks
- · Small back pack to carry your equipment
- · First aid kits will be supplied

NOTE 1: The field work will require a 15 minute walk into a reserve and working in uneven terrain. Any students with medical issues or requiring assistance should indicate this on their fieldwork participation form. All students must submit this form otherwise they cannot participate in the fieldwork. Please submit this form, via iLearn, by the due date advertised closer to the time.

NOTE 2: Occasionally there can be ticks and leeches present at the MQ Ecology Reserve, especially down near the creek. Neither insect carries disease but they are certainly a nuisance. To minimize chances of problems you need to wear suitable clothing (as described above). We suggest tucking your pants into your socks, shirts into pants, etc, and liberally applying insect repellent to your shoes, clothes and exposed skin.

Recommended Reading

There is no set textbook for this subject. Recommended books (all available from the library) that, between them, cover many of the topics dealt with in lectures include:

- Attiwill PM & Wilson B (Eds) (2006). *Ecology : An Australian Perspective*. Oxford University Press, South Melbourne, Vic.
- Atwell BJ, Kriedemann PE & Turnbull CGN (1999). *Plants In Action: Adaptation In Nature, Performance In Cultivation*. MacMillan Education Australia, Melbourne.
- Chapin FSI, Matson PA & Mooney HA (2002). *Principles of Terrestrial Ecosystem Ecology.* Springer, New York.
- Garnier E, Navas M-L, Grigulis K (2016) Plant Functional Diversity: Organism traits, community structure, and ecosystem properties. Oxford University Press, Oxford
- Gurevitch J, Scheiner SM & Fox GA (2006). The Ecology of Plants. Sinauer Associates,

Inc. Publishers, Sunderland, MA. 2nd Edition.

- Lambers H, Chapin FS & Pons TL (1998). *Plant Physiological Ecology.* Springer-Verlag, New York.
- Pugnaire FI & Valladares F (Eds) (2007). *Functional plant ecology*. CRC Press, Boca Raton. 2nd Edition.
- Raven PH, Evert RF, Eichhorn SE (2013). *Biology of plants*. WH Freeman, New York.
 8th Edition. (or 7th edition published 2005).
- Willis KJ & McElwain JC (2014). *The Evolution of Plants*. Oxford University Press, Oxford. 2nd Edition.

Most or all lectures will include a list of key readings (journal articles, book chapters etc). Where possible we will make these available, whether through the Library Reserve or through the unit iLearn page.

Technology Used and required

All course content will be made available via the iLearn unit webpage (URL for iLearn is: <u>http://ile</u> arn.mq.edu.au/). You are expected to use iLearn for:

- Regularly checking subject announcements;
- Downloading lecture and reference materials;
- Submitting assignments;
- Checking your grades.

Students will be required to use appropriate software, particularly Excel and Minitab (or *R*, if you like), for data analysis and graphing. Minitab is available to download and install on your laptop via http://web.science.mq.edu.au/it/software/. Alternatively, you may choose to run Minitab via iLab (see https://wiki.mq.edu.au/display/iLab/About). R can be downloaded online for free from http://www.r-project.org.

Unit Schedule

Lectures will be held on Mondays from 2-3 pm (in 25a WW-109, also known as W6B-109), and on Wednesdays from 2-3 pm (in 9 WW-108, also known as E6A-108). A full lecture schedule will be provided at the beginning of semester.

Practical/Tutorial classes will be held weekly in the Glasshouse Labs (5WW-428, also known as F5A-428 -- at the top of the F5A car park). Students will enrol in one of two tute classes, either Mondays from 9:30-11:30 am, or Wednesdays from 3-5pm. Further details of prac/tutorial topics will be given at the start of semester.

A compulsory On-Campus Session is scheduled for **Wednesday-Friday September 25-27**. This block practical is **compulsory for all students.** You are required to arrive well in time for a 9.00 am start each day. Expect to finish around 5.00 pm. Unless otherwise specified we will meet at the beginning of each day at the E8C level 1 teaching labs. Access to the labs is via the Biology courtyard.

** Please note, the OCS originally scheduled for Aug 17-18 has been cancelled (this course will not run in External mode in 2019) **

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.m q.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-centr al). Students should be aware of the following policies in particular with regard to Learning and Teaching:

- Academic Appeals Policy
- Academic Integrity Policy
- Academic Progression Policy
- Assessment Policy
- Fitness to Practice Procedure
- Grade Appeal Policy
- Complaint Management Procedure for Students and Members of the Public
- <u>Special Consideration Policy</u> (*Note: The Special Consideration Policy is effective from 4* December 2017 and replaces the Disruption to Studies Policy.)

Undergraduate students seeking more policy resources can visit the <u>Student Policy Gateway</u> (<u>htt</u> <u>ps://students.mq.edu.au/support/study/student-policy-gateway</u>). It is your one-stop-shop for the key policies you need to know about throughout your undergraduate student journey.

If you would like to see all the policies relevant to Learning and Teaching visit Policy Central (http s://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/p olicy-central).

Student Code of Conduct

Macquarie University students have a responsibility to be familiar with the Student Code of Conduct: https://students.mq.edu.au/study/getting-started/student-conduct

Results

Results published on platform other than <u>eStudent</u>, (eg. iLearn, Coursera etc.) or released directly by your Unit Convenor, are not confirmed as they are subject to final approval by the University. Once approved, final results will be sent to your student email address and will be made available in <u>eStudent</u>. For more information visit <u>ask.mq.edu.au</u> or if you are a Global MBA student contact globalmba.support@mq.edu.au

Student Support

Macquarie University provides a range of support services for students. For details, visit <u>http://stu</u> dents.mq.edu.au/support/

Learning Skills

Learning Skills (<u>mq.edu.au/learningskills</u>) provides academic writing resources and study strategies to improve your marks and take control of your study.

- Workshops
- StudyWise
- Academic Integrity Module for Students
- Ask a Learning Adviser

Student Services and Support

Students with a disability are encouraged to contact the **Disability Service** who can provide appropriate help with any issues that arise during their studies.

Student Enquiries

For all student enquiries, visit Student Connect at ask.mq.edu.au

If you are a Global MBA student contact globalmba.support@mq.edu.au

IT Help

For help with University computer systems and technology, visit <u>http://www.mq.edu.au/about_us/</u>offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the <u>Acceptable Use of IT Resources Policy</u>. The policy applies to all who connect to the MQ network including students.

Graduate Capabilities

Creative and Innovative

Our graduates will also be capable of creative thinking and of creating knowledge. They will be imaginative and open to experience and capable of innovation at work and in the community. We want them to be engaged in applying their critical, creative thinking.

This graduate capability is supported by:

Assessment tasks

- · Seminar on a journal article
- Ecology Reserve report

Discipline Specific Knowledge and Skills

Our graduates will take with them the intellectual development, depth and breadth of knowledge, scholarly understanding, and specific subject content in their chosen fields to make them competent and confident in their subject or profession. They will be able to demonstrate, where relevant, professional technical competence and meet professional standards. They will be able to articulate the structure of knowledge of their discipline, be able to adapt discipline-specific

knowledge to novel situations, and be able to contribute from their discipline to inter-disciplinary solutions to problems.

This graduate capability is supported by:

Learning outcomes

- Explain the factors underpinning major patterns of plant distribution globally and within Australia
- Recognise and describe features of major Australian plant families
- Summarise major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- Outline plant morphological and physiological adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- · Collect, analyse, present and interpret ecophysiological data

Assessment tasks

- Quizzes on lecture material
- Reports on pracs/tutes
- · Seminar on a journal article
- Ecology Reserve report
- Final examination

Critical, Analytical and Integrative Thinking

We want our graduates to be capable of reasoning, questioning and analysing, and to integrate and synthesise learning and knowledge from a range of sources and environments; to be able to critique constraints, assumptions and limitations; to be able to think independently and systemically in relation to scholarly activity, in the workplace, and in the world. We want them to have a level of scientific and information technology literacy.

This graduate capability is supported by:

Learning outcomes

- Explain the factors underpinning major patterns of plant distribution globally and within Australia
- Summarise major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- Outline plant morphological and physiological adaptations to major environmental factors (and limitations)

- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- · Collect, analyse, present and interpret ecophysiological data

Assessment tasks

- Reports on pracs/tutes
- · Seminar on a journal article
- Ecology Reserve report
- Final examination

Problem Solving and Research Capability

Our graduates should be capable of researching; of analysing, and interpreting and assessing data and information in various forms; of drawing connections across fields of knowledge; and they should be able to relate their knowledge to complex situations at work or in the world, in order to diagnose and solve problems. We want them to have the confidence to take the initiative in doing so, within an awareness of their own limitations.

This graduate capability is supported by:

Learning outcome

· Collect, analyse, present and interpret ecophysiological data

Assessment tasks

- Reports on pracs/tutes
- · Ecology Reserve report
- Final examination

Effective Communication

We want to develop in our students the ability to communicate and convey their views in forms effective with different audiences. We want our graduates to take with them the capability to read, listen, question, gather and evaluate information resources in a variety of formats, assess, write clearly, speak effectively, and to use visual communication and communication technologies as appropriate.

This graduate capability is supported by:

Learning outcomes

- Explain the factors underpinning major patterns of plant distribution globally and within Australia
- Summarise major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- · Outline plant morphological and physiological adaptations to major environmental factors

(and limitations)

- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- · Collect, analyse, present and interpret ecophysiological data

Assessment tasks

- Reports on pracs/tutes
- · Seminar on a journal article
- Ecology Reserve report
- Final examination

Engaged and Ethical Local and Global citizens

As local citizens our graduates will be aware of indigenous perspectives and of the nation's historical context. They will be engaged with the challenges of contemporary society and with knowledge and ideas. We want our graduates to have respect for diversity, to be open-minded, sensitive to others and inclusive, and to be open to other cultures and perspectives: they should have a level of cultural literacy. Our graduates should be aware of disadvantage and social justice, and be willing to participate to help create a wiser and better society.

This graduate capability is supported by:

Assessment task

Final examination

Socially and Environmentally Active and Responsible

We want our graduates to be aware of and have respect for self and others; to be able to work with others as a leader and a team player; to have a sense of connectedness with others and country; and to have a sense of mutual obligation. Our graduates should be informed and active participants in moving society towards sustainability.

This graduate capability is supported by:

Assessment task

Final examination

Changes from Previous Offering

In response to student feedback a number of changes have been made for the 2019 offering. This is the first time we will include the assessments "Quizzes on lecture material" and "Short reports on practical classes and tutorials". The major report in previous years ("Seedling growth experiment") is no longer part of the course. The activity "Traits and communities in the Macquarie University Ecology Reserve" will now run during September rather than August, include various new elements, and the associated written report will be worth substantially more marks than in previous years (and has max word length of 3000 rather than 1500 words). The core lecture material will be the same as in 2018, but several guest lectures will be on new topics, by new lecturers (outstanding researchers working in the Sydney region).

Changes since First Published

Date	Description
24/07/2019	Two 2018 dates changed to 2019