BIOL347

Plant Biology

S2 External 2018

Dept of Biological Sciences

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Disclaimer

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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:

Describe the major patterns of plant distribution globally and within Australia

Recognise and describe features of major Australian plant families

Describe major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales

List and discuss plant adaptations to major environmental factors (and limitations)

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

Collect, analyse and present ecophysiological data

Describe the basis of expected impacts of global change on plant functions

General Assessment Information

All students are required to attend both on-campus sessions. OCS1 will run on Saturday-Sunday August 25-26. OCS2 will run on Wed-Thurs September 26-27.

Preparation of written reports

Please use the following list to check your assignments before electronic submission.

- Report is typewritten
- 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 is correct
- Assignment is your own work - not copied verbatim from reference sources or other students. (see note on plagiarism, below, and the relevant University Policy)

Note: written assessment tasks will be marked within 3 weeks of submission.

Referencing

Both written reports (Assessments 1 and 3, below) will require references. The references you consult may include textbooks, edited books or scientific journals. References should be listed in

alphabetical order at the end and are not to be included in the word count.

There are different styles of referencing – each journal has its own individual style. For BIOL347 we have chosen to follow the style of *Austral Ecology* journal. For example,

Book:

Atwell B. J., Kriedemann P. E. & Turnbull C. G. N. (1999) *Plants in action: adaptation in nature, performance in cultivation*. MacMillan Education Australia, Melbourne.

Chapter in edited book:

Cornelissen J. H. C., Castro-Diez P. & Carnelli A. L. (1998) Variation in relative growth rate among woody species. In: *Inherent variation in plant growth. Physiological mechanisms and ecological consequence*s (eds H. Lambers, H. Poorter and M. M. I. Van Vuuren) pp. 363-92. Backhuys Publishers, Leiden.

Journal article:

Grime J. P. & Hunt R. (1975) Relative growth-rate: its range and adaptive significance in a local flora. *J Ecology* 63, 393-422.

In the main text of your report these sources would be cited as (Atwell *et al*. 1999; Cornelissen *et al*. 1998; Grime & Hunt 1975). Consult a recent issue of the journal if unsure about how to cite and format literature sources.

Final exam

If you receive special consideration for the final exam, a supplementary exam will be scheduled in the week of December 17-21 2018. By making a special consideration application for the final exam you are declaring yourself available for a resit during the supplementary examination period and will not be eligible for a second special consideration approval based on pre-existing commitments. Please ensure you are familiar with the policy prior to submitting an application. Approved applicants will receive an individual notification one week prior to the exam with the exact date and time of their supplementary examination.

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 Assignments 1 and 3 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.

Assessment Tasks

Name	Weighting	Hurdle	Due
MQ Ecology Reserve	10%	No	16/09/2018
Seminar on a journal article	10%	No	26/09/2018
Seedling growth experiment	30%	No	18/10/2018
Final examination	40%	No	TBA
Participation	10%	No	all semester

MQ Ecology Reserve

Due: **16/09/2018**
Weighting: **10%**

Assessment 1. Traits and communities in the Macquarie University Ecology Reserve

You are asked to submit a report on the practical work conducted at the MQ Ecology Reserve during the first on-campus session (August 25-26). **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 references and abstract): 1500 words. Journal style: *Austral Ecology*.

On successful completion you will be able to:

- Recognise and describe features of major Australian plant families
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies

Seminar on a journal article

Due: **26/09/2018**
Weighting: **10%**

Assessment 2: Seminar on a journal article of your choice

Choose a journal article published in the last 5 years on a plant ecology, ecophysiology or

vegetation science topic that interests you. During the second on-campus session (Sept 26-27) 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.

Articles may be found in journals such as (but not limited to) Austral Ecology, Australian Journal of Botany, Ecology, Functional Ecology, Functional Plant Biology, Global Ecology & Biogeography, Journal of Ecology, Journal of Vegetation Science, Journal of Biogeography, New Phytologist. Choose a paper that *you* found really interesting!

On successful completion you will be able to:

- List and discuss plant adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- Describe the basis of expected impacts of global change on plant functions

Seedling growth experiment

Due: **18/10/2018**
Weighting: **30%**

Assessment 3: Written report on the seedling growth experiment

You are asked to submit a report on the **Seedling Traits and Growth Rates** group experiment. This prac will be introduced during the first on-campus session and in tutorials, and is the chief focus of the second on-campus session. Maximum seedling growth rates achieved under favourable growth conditions are widely regarded as a key element of plant ecological strategy. The over-arching questions in this prac are: "What plant traits are the key drivers of differences among species in their seedling growth rates?", and "Does the answer to this question change for plants grown at high CO2?". In the glasshouses we are growing seedlings of 10 native species, with half the plants grown under elevated atmospheric CO_2 concentration and half under ambient CO_2 concentration. During weeks 6-7 students will work as groups to make various trait measurements on glasshouse-grown seedlings (we'll organise days and times during the first on-campus session). During the second on-campus session we will calculate seedling growth rates and other traits, discuss research questions, and run various statistical analyses.

A written report on this work will be due on October 18th. This is the major written assessment for this unit and will require you to synthesise ideas across lectures and practicals, and to come up with (and test) some of your own research ideas. 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. Maximum length, not including references and abstract is 3000 words. Journal style: *Austral Ecology*.

External students who are unable to come in for group work during weeks 6-7 (see above) will instead be given a small extra assessment task: You are asked to submit directly to the unit Convenor (by email, by September 26) a one-page justification for the article you chose for your seminar. Please provide the publication details of the article (authors, year, title, journal, volume and page numbers) and a short summary of the general background, questions addressed, approaches used and key findings. Justify why you think this is a good choice for your oral seminar. Do not just repeat the Abstract of the paper – it must be in your own words.

On successful completion you will be able to:

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

Final examination

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

Assessment 4: Final examination

The final examination will consist of a series of multiple choice and short-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:

- Describe the major patterns of plant distribution globally and within Australia
- Recognise and describe features of major Australian plant families
- Describe major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- List and discuss plant adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- Describe the basis of expected impacts of global change on plant functions

Participation

Due: **all semester**

Weighting: **10%**

Ten per cent of your overall mark is for "attendance and participation". This is to encourage students to turn up and enthusiastically participate in the various activities run throughout the semester: field work during OC1, tutorials, measuring seedling physiology, harvesting plants. Note, tutorials for externally-enrolled students will be run during the second on-campus session, in late September.

On successful completion you will be able to:

- Collect, analyse and present ecophysiological data

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 Friday 17th August.**

NOTE 2: After rain there can be leeches present at the MQ Ecology Reserve, especially down

near the creek. Leeches are non-toxic and do not carry disease, but they are still a nuisance. To minimize chances of leech problems we suggest tucking your pants into your socks, shirts into pants, etc, and liberally applying insect repellent to your shoes, clothes and exposed skin. Initially leeches can be removed by flicking, but once well attached the best way to remove a leech is with salt. Apply a band-aid immediately, since they inject an anti-coagulant to ensure a nice blood flow. (MQ field staff have First Aid kits and are accredited in first aid). Ticks are also a possibility but can be readily detached, are also discouraged by insect repellent.

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: http://ilearn.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).

Unit Schedule

Lectures will be held on Mondays from 3-4 pm in E5A-110 (11 Wally's Walk) and on Wednesdays from 12-1 pm in E8A-386 (14 Eastern Rd). A timetable of lectures will be put up on iLearn close to the start of semester.

Tutorials for internal students will be held weekly in the Glasshouse Labs (F5A-428, at the top of the F5A car park). Students will be allocated to one of two tute classes, one on Mondays (4-5 pm), one on Wednesdays (2-3 pm). Further details of tutorial topics will be given at the start of semester. Tutorials for external students will be held during the On-Campus Sessions.

Compulsory On-Campus Sessions are scheduled for Sat-Sun August 25-26 ("OCS1"), and Wed-Thurs September 26-27 ("OCS2"). These block practicals are **compulsory for all students (internal and external).** You are required to arrive well in time for a 9.00 am start each day. Expect to finish around 5.00 pm.

During August 25 we will work for part of the day in the field, at the MQ Ecology Reserve (a short walk from the University). More information will be posted on the unit's iLearn website in advance of the on-campus sessions.

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.

Policies and Procedures

Macquarie University policies and procedures are accessible from Policy Central (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-central). 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
- Special Consideration Policy *(**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 Student Policy Gateway (https://students.mq.edu.au/support/study/student-policy-gateway). 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 (https://staff.mq.edu.au/work/strategy-planning-and-governance/university-policies-and-procedures/policy-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 shown in *iLearn*, 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 eStudent. For more information visit ask.mq.edu.au.

Student Support

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

Learning Skills

Learning Skills (mq.edu.au/learningskills) 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

IT Help

For help with University computer systems and technology, visit http://www.mq.edu.au/about_us/

offices_and_units/information_technology/help/.

When using the University's IT, you must adhere to the Acceptable Use of IT Resources Policy. 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 task

- Seminar on a journal article

Capable of Professional and Personal Judgement and Initiative

We want our graduates to have emotional intelligence and sound interpersonal skills and to demonstrate discernment and common sense in their professional and personal judgement. They will exercise initiative as needed. They will be capable of risk assessment, and be able to handle ambiguity and complexity, enabling them to be adaptable in diverse and changing environments.

This graduate capability is supported by:

Assessment task

- Seedling growth experiment

Commitment to Continuous Learning

Our graduates will have enquiring minds and a literate curiosity which will lead them to pursue knowledge for its own sake. They will continue to pursue learning in their careers and as they participate in the world. They will be capable of reflecting on their experiences and relationships with others and the environment, learning from them, and growing - personally, professionally and socially.

This graduate capability is supported by:

Assessment task

- Participation

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

- Describe the major patterns of plant distribution globally and within Australia
- Recognise and describe features of major Australian plant families
- Describe major features of photosynthesis, respiration, plant water use and nutrient use, both at physiological and ecosystem scales
- List and discuss plant adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- Collect, analyse and present ecophysiological data
- Describe the basis of expected impacts of global change on plant functions

Assessment tasks

- MQ Ecology Reserve
- Seminar on a journal article
- Seedling growth experiment
- 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

- List and discuss plant adaptations to major environmental factors (and limitations)
- Demonstrate understanding of the role of plant functional traits in plant ecological strategies
- Collect, analyse and present ecophysiological data
- Describe the basis of expected impacts of global change on plant functions

Assessment tasks

- MQ Ecology Reserve

- Seminar on a journal article
- Seedling growth experiment
- Final examination
- Participation

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 and present ecophysiological data

Assessment tasks

- MQ Ecology Reserve
- Seedling growth experiment
- 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 outcome

- Collect, analyse and present ecophysiological data

Assessment tasks

- MQ Ecology Reserve
- Seminar on a journal article
- Seedling growth experiment
- Participation

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:

Learning outcome

- Describe the basis of expected impacts of global change on plant functions

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:

Learning outcome

- Describe the basis of expected impacts of global change on plant functions

Assessment task

- Final examination

Changes since First Published

Date	Description
11/09/2018	Amended assessment due dates.
27/07/2018	-