WESTERN SYDNEY UNIVERSITY

Hawkesbury Institute for the Environment

HOW ELEVATED ATMOSPHERIC CO_2 DRIVES INVERTEBRATE INTERACTIONS AND COMMUNITY CHANGE IN GRASSES

Increases in atmospheric CO_2 concentrations have the capacity to shape plant-herbivore interactions with wider impacts on other trophic groups. Previous work in a grassy woodland exposed to current and future (+150ppm) concentrations of CO_2 (EucFACE in Australia) suggested that invertebrate populations had already declined by around 14% under elevated CO_2 (eCO_2). It remains unclear, however, which species were in decline, whether significant functional groups were affected or if populations have now stabilised. Simultaneously, several grasses in the understory show altered levels of silicon defence against invertebrate herbivores under eCO_2, which may explain some of the underlying changes in invertebrate communities.

This project will investigate the impacts of eCO_2 on invertebrates using two distinct approaches. Firstly, the student will characterise community changes in EucFACE using field sampling of understory grassland invertebrates and DNA meta-barcoding. Secondly, the project will focus on key trophic groups by conducting mesocosm experiments with defined (e.g. at risk) invertebrate communities within open top chambers that manipulate CO_2 . This project offers an exciting opportunity to work at Australia's largest climate change experiment (EucFACE) to drive our understanding of how future CO_2 concentrations will affect invertebrates. It also provides the opportunity to design and execute manipulative experiments to explain some of these patterns in the grassland component of the ecosystem, focussing on silicon-based herbivore defences in the grasses. This project provides a unique blend of training opportunities ranging from molecular techniques to organismal biology at the field-scale.

WHAT DOES THE SCHOLARSHIP PROVIDE?

- Domestic students will receive a tax free stipend of $27,596 per annum and a funded place in the doctoral degree.
- International students will receive a tax free stipend of $27,596 per annum. Those with a strong track record will receive a fee waiver.
- All International students are required to hold an Overseas Student Health Care (OSHC) policy covering the duration of their studies in Australia. The HIE will provide funding for a single Overseas Student Health Cover policy.
- The project will also provide substantial benefits in terms of additional operational funding for project fieldwork and data collection, and travel and conference attendance.

CRITERIA

We welcome applicants from a range of backgrounds who are keen to apply their skills to key issues in environmental biology. In particular, the project is suitable for candidates with strong interests in plant biology, climate change and/or entomology. The successful applicant should:

- hold qualifications and experience equal to one of the following (i) an Australian Bachelor Honours degree, (ii) coursework Masters with at least a 25% research component, (iii) a Research Masters degree or (iv) equivalent overseas qualifications.
- demonstrate strong academic performance in ecology, plants and entomology.
- have an understanding of the importance of climate change adaptation.
- be enthusiastic and highly motivated to undertake further study at an advanced level.
- possess excellent written and verbal communication skills.
- be willing to learn analytical techniques applicable to molecular biology and population / community ecology.
- International applicants must also meet English language proficiency

HOW TO APPLY

- Contact Associate Professor Scott Johnson scott.johnson@westernsydney.edu.au to discuss your eligibility, the project requirements and your intention to apply.
- Complete the application form via the link http://bit.ly/30tsRQZ
- Compile your CV, contact information for two referees and a one-page proposal stating how your research interests align with the project aims.
- Ensure all documentation is certified according to Western Sydney University requirements.
- All applications and supporting documentation must be submitted directly to the Graduate Research School as follows:
- Use the email subject line: **Application_2019_105_HIE**
- Submit to grs.scholarships@westernsydney.edu.au

Closing date: 7 August 2019