

PhD Projects in Restoration Genetics

University of Tasmania – School of Biological Sciences

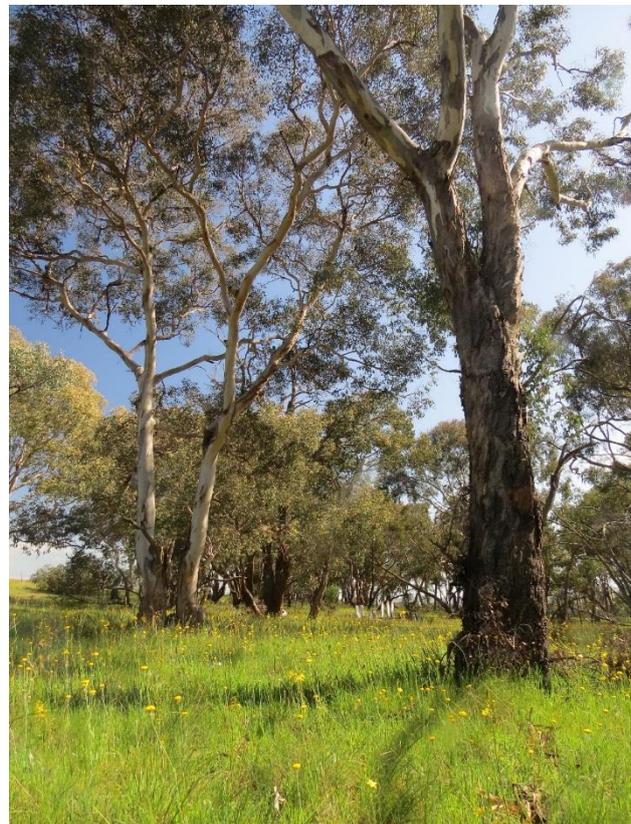
Location: Hobart, Tasmania, Australia

The University of Tasmania, in collaboration with CSIRO Land & Water and the ARC Centre for Forest Value are offering several exciting opportunities for post-graduate study in the rapidly growing field of ‘restoration genetics’. Successful candidates will work with a cross-disciplinary team of geneticists, ecologists and physiologists, gaining experience with industry partners (e.g., Greening Australia) and other collaborators.

The Projects

Climate adaptation capacity in native species of declining woodlands

Eucalypts are keystone species in numerous Australian ecosystems, many of which are under threat. As climates change, restoration programs must maximise the capacity of regenerating ecosystems to adapt to new environments. The choice of germplasm for ecological restoration requires careful consideration to maximise survival in a rapidly changing climate. One consideration is the long-term adaptive potential of the genetic material (provenance) being used. Various strategies have been developed, particularly focused on maximising genetic diversity of seed sources. In the midlands of Tasmania, large long-term experiments have been established to test a variety of restoration strategies. Using these field trials and wild populations of native species, the research projects use morphological, physiological and genomic approaches to assess adaptation capacity in *Eucalyptus* and associated forbs (i.e. herbaceous plants other than grasses) and to test and validate strategies for optimising survival and performance of restoration plantings now and into the future.



The eucalypts

Eucalyptus pauciflora and *E. ovata* are keystone species of Tasmanian woodlands. In the agricultural midlands of Tasmania, the University of Tasmania has partnered with Greening Australia to plant over 40,000 trees in ecological and genetic performance trials in an effort to restore a highly degraded landscape. These common environment field trials, in addition to native vegetation, provide unique opportunities for original research and validation of current and new approaches to forest restoration.

There are several projects available to higher degree research students who wish to contribute to real world science using traditional quantitative genetic analyses, as well as the most advanced DNA and computer-modelling technologies available.

To discuss the eucalypt projects, please contact:

B.M.Potts@utas.edu.au

Rene.Vaillancourt@utas.edu.au

Dorothy.Steane@utas.edu.au

The forbs

Woodland forbs are one of the most threatened biological groups in eucalypt woodlands of southern Australian agricultural landscapes. In particular, a suite of species known as ‘declining woodland forbs’ do not withstand regular livestock grazing or fertilisation, and so are now confined to rare, little-grazed, unfertilised woodland remnants widely scattered through agricultural landscapes. Many of these species are also culturally significant, particularly tuberous lilies, orchids and daisies which formed the staple of Aboriginal diets.

Conservation of declining woodland forbs is dependent on *in situ* persistence in small, high quality remnants and, increasingly, restoration efforts in woodland landscapes. These habitats are vulnerable to the additional challenge of climate change, but little is known about how woodland forbs will be able to adapt to a warming and drying climate. As generally widespread species that span climatic ranges beyond that expected under climate change, it may be possible to enhance their climate resilience by exploiting genotypes that are already better adapted to projected future climates.

This project aims to investigate climate adaptation capacity and applications to ecological restoration in a suite of declining woodland forbs, using ecophysiological and genomic approaches. Species with germplasm collections for initial investigations include *Microseris lanceolata* (Yam Daisy), *Arthropodium fimbriatum* (Chocolate Lily) and *Bulbine bulbosa* (Bulbine Lily).



To discuss the forb projects, please contact:

Suzanne.Prober@csiro.au;

Dorothy.Steane@utas.edu.au

Candidates

Applicants should have First Class Honours or Master's degree in Science, including the fields of genetics, genomics, physiology, ecology, bioinformatics or a related discipline. Strong academic performance, excellent oral and written communication skills and published output will be additional assessment criteria.

Applicant must be eligible to enrol in a PhD with the University of Tasmania. For a complete list of the University of Tasmania's minimum entry requirements, please refer to:

<http://www.utas.edu.au/admissions/undergraduate/admission-requirements>

Scholarship remuneration

Prospective students will be provided with assistance to apply for a scholarship. Domestic students will be expected to apply for an APA or equivalent scholarship. International students that can provide their own stipend and tuition support will be eligible to apply for an international fee waiver.

Enquiries

For general enquiries about these projects, please contact:

Dorothy.Steane@utas.edu.au

B.M.Potts@utas.edu.au

Rene.Vaillancourt@utas.edu.au