PhD Scholarship, University of Tasmania

Project Title: Biotic agents and site silvicultural practices: combined management approaches to maximise tree survival in hardwood plantations

Australian Research Council Training Centre for Forest Value
Discipline of Biological Sciences
School of Natural Sciences
College of Science and Engineering
University of Tasmania

Closing date: 30 November 2021

The Project

There is a need to document the drivers of poor survival of plantation trees, both in the early stages of planting and after trees have become established and suffer subsequent death. More specifically there are significant gaps in our understanding of how above- and below-ground processes interact to affect tree survival.

This PhD project will be conducted in two parts.

1. *A review and collation of information on the drivers of poor survival in young trees:* The PhD candidate will conduct a review identifying the drivers of poor survival, with a focus on the hardwood plantation species from the National Plantation Inventory zones. The review will shine a spotlight on the interactive effects of biotic pests, site conditions, and management protocols on the above- and below-ground processes that affect plant survival.
2. *Determine the causes of tree fall and death of established trees in hardwood plantations*: There has been recently noted tree fall in a large number of *E. nitens* trees (aged 6-10 years) in plantations. Similar mid-rotation observations have been previously reported by forest growers. It is hypothesised that below-ground root processes are the cause of these tree deaths. Bringing in factors of importance identified in part 1 (including the role of tree genotype), this project will address the following questions:
    a. How does initial and subsequent site management influence soil and root processes?
    b. Does below-ground pathogen and microbial community composition and root health influence likelihood of tree fall and how does this relate to site management?
    c. How can site management be manipulated to minimise tree fall via its impact on belowground communities and root development and traits.

Project outcomes will include:

- Knowledge of the drivers of tree survival across the hardwood plantation species from the National Plantation Inventory zones.
- An understanding of the importance of below-ground processes in tree survival and the interactive effects with biotic agents and site management protocols.
- Identification of the causes of tree fall in established *E. nitens* trees.

These results will improve site management protocols to maximise tree survival in hardwood plantations.

Research Environment

Candidates will work in the ARC Training Centre for Forest Value within the Discipline of Biological Sciences at the University of Tasmania. The Centre for Forest Value is a research centre focused on forests and forest industries research, working across native, restored and plantation forests and across the full forest industries supply chain . Students in the Centre for Forest Value work closely with external stakeholders including industry partners and not-for-profit organisations to conduct collaborative research with real-world impact. Biological Sciences provides a stimulating academic environment, conducting world class research and teaching and learning in Plant Biology, Zoology, Ecology and Evolutionary Biology – all areas that scored the highest rating in the most recent Excellence in

Research for Australia submission – Australia's national research evaluation framework. Biological Sciences has a vibrant and fun postgraduate community with events organised by the Postgraduate Society for Biological Sciences to connect individuals and research groups within the Discipline.

This project is funded by the University of Tasmania in collaboration with the Growers Research Advisory Committee of Forest and Wood Products Australia and will have strong links with industry collaborators. Candidates will be expected to spend a proportion of their candidature working closely with industry.

Primary Supervisor: Professor Mark Hovenden (mark.hovenden@utas.edu.au)

Funding

The successful applicant will receive a scholarship which provides:

- a living allowance stipend of $28,597 per annum (2021 rate, indexed annually) for 3.5 years;
- a relocation allowance of up to $2,000;
- $10,000 per annum support for project costs for 3 years; and
- a tuition fees offset covering the cost of tuition fees for up to 4 years (domestic applicants only)

International applicants may receive a University of Tasmania Fees Offset for up to four years.

The scholarship supporting this project is funded by the University of Tasmania, Forest and Wood Products Australia Limited and the Australian Government through the Research Training Program.

Eligibility

The project is open to domestic (Australia and New Zealand) and international applicants who are already in Australia (onshore) at the time of submitting their application.

Due to current Australian COVID-19 travel restrictions the University cannot accept applications from International applicants who are currently overseas (apart from applicants from New Zealand as noted above).

Applicants should review the Higher Degree by Research minimum entry requirements and the following additional eligibility criteria specific to this project/scholarship:

- ability to meet minimum English requirements (international applicants)
- A minimum of a First Class Honours Degree, Masters by Research or equivalent

Selection Criteria

The project is competitively assessed and awarded. Selection is based on academic merit and suitability to the project as determined by the College.

Application Process

There is a three-step application process:

1. Select your project, and check you meet the eligibility and selection criteria;
2. Contact the Primary Supervisor, Professor Mark Hovenden (mark.hovenden@utas.edu.au) to discuss the project before submitting an application; and
3. Click here to submit an application by the closing date listed above.
    - Copy and paste the title of the project from this advertisement into your application.

- As part of your application you will be required to submit a covering letter, a CV including 2 x referees and your project research proposal, after discussion with the primary supervisor.

Following the application closing date applications will be assessed within the College. Applicants should expect to receive notification of the outcome by email.