

RESEARCH DIRECTIONS

The heat is on the red bloodwood

Dr Paul Rymer, of the Hawkesbury Institute for the Environment, has been awarded funding to explore how plants might respond to the heat of climate change. The project, which is supported by the University of Western Sydney in partnership with Western Australia's Department of Parks and Wildlife (DPaW), will test the physiological and genetic mechanisms enabling plants to withstand global warming and heat waves.

'Understanding the capacity of plants to respond to climate change is essential for the maintenance of biodiversity and productivity of primary industries,' says Dr Rymer. 'The rate of climate change has exceeded predictions and Australia will have more intense and frequent heat waves. The impacts of climate change will vary by both climatic region and plant genotype but there is inadequate information on the ability of plants to adapt and/or acclimatise.'

Dr Rymer, and his research partner, Dr Margaret Byrne (DPaW), will investigate a bloodwood, *Corymbia calophylla* (Myrteaceae family), commonly known as the Marri tree. It is native to Western Australia and grows to about 50 metres tall, with very large buds and fruit prized in the horticultural industry. Marri timber is increasingly used for household furniture, because of its honey colour and distinctive vein structure.

Their project will use a novel experimental "transcriptomic" approach to unravel the mechanisms involved in plant responses to future warmer and extreme temperatures. Dr Rymer's research aims to determine the relative importance of adaptation (trait shifts by genotype) and plasticity (trait shifts by environment) for plants to persist in the face of rapidly changing climatic conditions.

Three populations will be selected in two climatic regions – in the north and south of the distribution.



Ten seedlings from the six groups will be grown in temperature-controlled glasshouses, simulated as temperate- and subtropical regions. Growth, functional and physiological traits will be measured before a heat wave is introduced. The mercury will climb 8°C for five days and the plants will be monitored to determine their resistance and resilience to thermal stress.

For many Australian plants, we are lacking a basic ecological, physiological and molecular characterisation. This project aims to address that knowledge gap, investigate fundamental questions in evolutionary ecology and determine the capacity of Australian plants to adapt to climate change. It will also identify suitable genotypes and geographic areas for the successful establishment of plantations for forestry and ecological restoration.

Project Title: Adaptive capacity of *Corymbia calophylla* to future temperature extremes

Funding has been set at: \$43,676

Contact Details: p.rymer@uws.edu.au

URL - <http://www.uws.edu.au/hie>

January 2014