

Progress Report SP 2010-003

**Temperature thresholds for recruitment in
south-west Western Australian flora**

Plant Science and Herbarium

Project Core Team

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Project Team

granted

Program Leader

granted

Directorate

granted

Temperature thresholds for recruitment in south-west Western Australian flora

A Cochrane

Context

Germination is one of the fundamental biological activities vital to persistence in obligate-seeding species. Climate directly influences germination and seedling growth, with temperature arguably the most important climatic variable after moisture, since it synchronises germination to environmental conditions most suitable for seedling establishment. Although species have climate preferences, knowledge of basic physiological tolerances is lacking for most native species. Assessing direct physiological constraints on recruitment (e.g. upper and lower temperature limits for germination) and early seedling growth may assist our understanding of the impact of warming temperatures on the persistence of plant species at the limits of their geographic range.

Aims

- Determine temperature thresholds for germination in south-west Western Australia flora.
- Identify potentially 'at risk' plant species and incorporate this data into the modelling of impacts of climate change on 'at risk' species.
- Utilise this data as a basis for developing management response options, including fire management and flora translocations.

Progress

- Paper published in *Seed Science Research* describing effects of temperature on germination of Western Australian obligate seeding *Banksia* species.
- Paper in press in *Austral Ecology* describing variation in plant functional traits across and within four species of Western Australian *Banksia* (Proteaceae) along a natural climate gradient.
- Project assessing the impact of long duration, temperature fluctuations on overcoming seed dormancy in common *Acacia* species nearing completion.
- Continuing assessment of the temperature niche for germination in species from the south west of Western Australia focussing on a range of *Eucalyptus* species.

Management implications

- Developing a framework to assess seed viability under environmental change will assist in restoration and land management programs.
- Incorporation of seed biology knowledge into threatened species translocations will increase the opportunities for recovery success.

Future directions

- Draft and submit a paper on the influence of temperature on seed germination in a range of Western Australian *Eucalyptus* species.
- Draft and submit a paper on the influence of long duration temperature fluctuations on overcoming dormancy in a range of Western Australian *Acacia* species.
- Ongoing studies profiling the temperature niche for germination of a range of Western Australian species.