



## Seed Conservation: Supporting the conservation of plant diversity

by Anne Cochrane and Andrew Crawford DEC Science Division, (08)9334 0502  
[anne.cochrane@dec.wa.gov.au](mailto:anne.cochrane@dec.wa.gov.au), [andrew.crawford@dec.wa.gov.au](mailto:andrew.crawford@dec.wa.gov.au)

### Background

Western Australia has a rich, diverse flora of more than 11,000 species. Some of these species are at risk of extinction in the wild by human and other influences (e.g. clearing, disease, salinity, weed invasion, grazing and changing climates) with over 2,500 species considered to be rare, threatened or poorly known. This combination of high species diversity along with high levels of threat has resulted in the south west of Western Australia being listed as one of 34 international biodiversity hotspots. Recovery plans are implemented to avoid the loss of any species in the wild and complementing these *in situ* recovery actions is the *ex situ* conservation storage of seeds.



*Ex situ* seed conservation utilises proven methods by which seeds can be stored under conditions (low temperature and low moisture) that reduce viability loss over time. These methods ensure viable seeds are available when and if they are needed to be used for species recovery. Seeds can be used to help restore degraded lands, reintroduce species into the wild and restock depleted populations. Seeds can also be used in scientific research to understand seed biology, conservation genetics, disease susceptibility and species' response to changing climates – information that assists on-ground conservation and management.

DEC's *ex situ* seed conservation initiative, managed through the Threatened Flora Seed Centre in Perth, focuses on those species most at risk in the wild (Declared Rare Flora), the poorly known species (Priority Flora), component species of Threatened Ecological Communities and species that may become threatened in the future through the impact of climate change and other major threats.



Currently research is investigating:

- The temperature limits on recruitment in narrow range endemics to provide information on plant response and potential to cope with climate warming.
- The importance of timing seed collections to increase seed longevity in storage.
- Anticipated longevity of seed in storage through accelerated ageing experiments.
- Seed germination characteristics to maximise the use of seeds in recovery.



Seed conservation complements on-ground actions and is an efficient, cost effective way to conserve variation within and between species

## Findings

Major outcomes of the Threatened Flora Seed Centre's activities since its establishment in 1992 include:

- Collection and storage of more than 70 per cent of Western Australia's Declared Rare Flora.
- Collection and storage of more than one third of Western Australia's Priority Flora.
- Provision of seeds and seedling material for over 30 Threatened species reintroductions.
- Duplication of species for safekeeping with the Royal Botanic Gardens, Kew's Millennium Seed Bank, UK.
- Identification of new populations and taxa.
- Provision of plant specimens that vouch for the identity of the seed conserved.
- Provision of seedling material for Phytophthora dieback susceptibility testing.
- Conservation of genetic material from populations of at least two species now thought to be extinct in the wild.
- Minimal viability decline detected in seed from 176 taxa stored under standard genebank conditions (-20°C / eRH 15 per cent) for up to 11 years.



Temperature gradient plates are used to create temperature profiles and to assess temperature limits for germination

## Management Implications

Findings from seed germination research are used to improve the methods for turning seed into whole plants to increase the success of recovery of threatened plant species. The results generated through seed storage research will help determine appropriate storage conditions that will maximise seed longevity for conservation. Research centred on understanding seeds' response to elevated temperatures during germination is providing vital information that highlights species vulnerable to climate change and will provide data for use in modelling.