

Progress Report SP 1999-010

Seed biology, seedbank dynamics and collection and storage of seed of rare and threatened Western Australian taxa

Plant Science and Herbarium

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Project Team	granted
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Context

Seed conservation is a specific and targeted action to conserve biodiversity and entails the banking of genetic material in the form of seed. Seed banking provides an important opportunity for assessing and utilising genetic material for *in situ* recovery actions, and for seed research. Understanding the seed biology and ecology of plant species is important for the conservation and management of conservation-significant Western Australian taxa and for developing and implementing recovery plans for rare and threatened flora.

Aims

- Provide a cost effective and efficient interim solution to the loss of plant genetic diversity by collecting and storing seed of rare and threatened Western Australian plant species, and thereby provide a focus for flora recovery.
- Increase knowledge of seed biology, ecology and longevity.
- Incorporate all information into a corporate database and provide relevant information on seed availability, seed biology, storage requirements and viability of seed of rare and threatened taxa to assist the development of management prescriptions and preparation of interim recovery plans and translocation plans.

Progress

- A total of 135 seed collections (106 species) were banked at the Western Australia Seed Centre (Threatened Flora Seed Vault); 82 of these collections (55 species) were listed as Critically Endangered, Endangered or Vulnerable (threatened flora), 46 of these collections (44 species) were listed as priority flora.
- Sixteen seed collections from 12 Stirling Range species were collected as part of post-fire recovery projects.
- Sixty seed collections from 52 plant species that will potentially be impacted by Myrtle Rust were collected.
- Two hundred and fifty-nine germination tests were conducted.
- Seedlings of 18 threatened flora species were provided for translocation.
- Seedlings of two priority flora species were used in an establishment trial in the Stirling Range National Park.
- One species (*Darwinia squarrosa*) was planted into a seed production area at Woodlupine Primary School.
- The seed bank now contains 6044 collections (1959 taxa) representing 346 threatened flora, 744 priority flora and 869 restoration species.
- Testing of the storage performance of seed from 61 species (83 collections) that had been in storage for a period of at least 10 years was undertaken. Provisional results (46 tests) indicate a majority of these collections (43 collections; 93%) have maintained their viability over a period of 11 to 27 years.

Management implications

- Seed conservation supports the survival of species in the wild by providing the genetic material for reintroduction; seed is provided for translocations of threatened flora and for departmental restoration projects.
- Provision of seed biology and ecology data increases the success of threatened flora recovery actions, particularly through knowledge of how pre-treatments may stimulate seed germination.
- Re-testing of old collections (> 10 years) is showing that the storage conditions being utilised at the Western Australian Seed Centre are maintaining the viability of most collections tested. Viability declines

whilst uncommon, have occurred, highlighting the importance of ongoing monitoring, at regular intervals, to the management of ex situ seed collections.

Future directions

- Ongoing collection of seed of threatened flora for long-term conservation and use in translocations.
- Secure seed of conservation significant Western Australian native plant species potentially susceptible to myrtle rust prior to disease occurrence.
- Seed collection to assist Stirling Range threatened flora post fire recovery.
- Collect seed and genetic material from populations of *Banksia cuneata* and *Chorizema humile* for a genetic study to clarify the management units for these two species.
- Complete a review of the long-term (>10 year) storage performance of seed collections held in the Western Australian Seed Centre.
- Provide seed, data and expertise to an ARC linkage project - Predicting seed lifespan for improved curation of conservation seed banks.