Progress Report SP 2018-048

Conservation biotechnology

BCS Kings Park Science

Project Core Team

X X **Supervising Scientist** Bryn Funnekotter
Data Custodian Bryn Funnekotter

Project status as of July 6, 2023, 1:19 p.m.

X X Update requested

Document endorsements and approvals as of July 6, 2023, 1:19 p.m.

X X
Project Team granted
Program Leader granted
Directorate required

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E Bunn, B Funnekotter

Context

Research into *in vitro* and cryogenic science streams is essential to progress and enhance the *ex situ* conservation and germplasm storage options for threatened plant species, where other forms of germplasm storage are not possible. The micropropagation of threatened taxa also provides a source of greenstock for plant translocation studies in cases where normal propagation is not possible. A range of species are kept in liquid nitrogen storage for conservation and research purposes, including many rare and threatened vascular plant taxa and seeds and mycorrhizal fungi of many native orchid species, including a number of rare taxa.

Aims

- Develop micropropagation for plants requiring translocation and for living collections.
- Develop cryopreservation protocols for ex-situ long-term storage of germplasm of selected species.
- Ensure curation and maintenance of the TC collection aligns with and is relevant to the new BGPA Ex-situ Conservation Strategy

Progress

- Research is continuing on the collaborative ARC Linkage Project conserving species affected by Myrtle Rust
- Novel cryoprotective agents were assessed for thermal characteristics and toxicity to plant germplasm for cryostorage. This research is contributing some preliminary results for a new ARC Linkage Project planned to assess novel cryoprotective agents needed for plant cryopreservation.
- A novel pH indicator mixture was developed for monitoring performance of tissue culture medium across multiple species.

Management implications

- *In vitro* propagation provides *ex situ* germplasm material for threatened species where cutting propagation or seed is unavailable. This approach provides biosecure storage in culture collections or cool storage for selected genetic material of endangered plants. This material can be accessed to provide plants for future translocations if required.
- Cryopreservation provides very long-term biosecure storage of shoot tips, protocorms, seeds and other material of threatened plant species, that can also be revived and utilised to produce plants for restoration purposes.

Future directions

- Audit the *in vitro* collection the assess relevance, purpose and completeness in regards to the new BGPA Ex-situ Conservation Strategy.
- Continue research to understand the effects of cryopreservation on the metabolism of plant germplasm material.
- Develop transcriptomic methods to assess stress response in plant material during cryopreservation.
- Develop *in vitro* propagation for new species of threatened Australian plants.
- Develop cryopreservation protocols for species that may possess recalcitrant seeds and/or may be threatened by Myrtle Rust in the future.