PROJECT 5: PROGRESS REPORT

September 1995

IDENTIFYING, GERMPLASM STORAGE AND *IN VITRO* PROPAGATION OF *PHYTOPHTHORA* AND CANKER THREATENED TAXA

A. Cochrane, D. Coates and A. Kelly

1. IDENTIFICATION OF RARE AND THREATENED FLORA AT RISK FROM DIEBACK DISEASE

The Department of Conservation and Land Management's (Ken Atkins 14/09/94) Declared Rare and Priority Flora List for Western Australia is still being used as the basis for all collections. Recent regional surveys have identified other taxa in need of attention. The plant groups targeted for collection continue to be predominantly from the families Proteaceae, Epacridaceae, Fabaceae, and Myrtaceae.

2. IN VITRO PROPAGATION

Discontinued (see Year 1 report)

3. CRYOSTORAGE

Discontinued (see Year 1 report)

4. SEED COLLECTION

Two hundred and thirty-nine accessions of rare or priority taxa have been incorporated into the Threatened Flora Seed Centre as of 15 September, 1995. This represents 99 taxa in 11 families. Several visits to the northern sandplains have resulted in the collection of a number of accessions of rare and geographically restricted taxa. Other collections trips have been in the species-rich south coast and southern sandplains. New populations of rare and threatened taxa continue to be recorded on routine field collection trips. Collaboration with other CALM staff and collectors from Kings Park and Botanic Gardens continues to yield good results.

5. SEED STORAGE, VIABILITY TESTING AND INVENTORY SYSTEM

Sixty-nine accessions have been retested for viability after 1 year in storage at -18^{o}C, with a further 26 accessions still in the process of retesting. The majority of accessions responded positively to storage conditions with little to no loss in germinability and in some instances improved germinability. *Dryandra* species have shown the most varied response and further testing using a variety of treatments to promote optimal germination is required. Some encouraging germination results have been gained through the use of new techniques such as those developed by Kings Park and Botanic Gardens (e.g. the use of smoke to break dormancy and enhance germination of *Verticordia* spp.). A range of techniques are being used with some success to gain a better understanding of the biology of some of these threatened taxa.

New accessions will continue to be monitored on a yearly, then 5 yearly basis until adequate knowledge of the flora's response to sub-zero storage is attained.

The Threatened Flora Seed Centre's WASeed database is now in its final version and data entry will commence shortly. This database will facilitate monitoring of accessions through its capacity to graph germination results.

The TFSC large reprint collection of articles on seed germination and dormancy, and storage techniques has been databased and it is hoped that a reference listing of all papers can be published with abstracts in the near future.

6. FUTURE COLLECTIONS AND PROPOSED DEVELOPMENTS

Recent contact with members of the Seed Conservation Section of Royal Botanic Gardens, Kew, UK has proved most useful in the formulation of new ideas for seed storage protocols and facilities. It is hoped that further liaison will continue to our benefit.

An attempt to obtain a Churchill Fellowship to visit the Seed Conservation Section of Wakehurst Place was unsuccessful. It is hoped that other funding may be sought to visit the facility and to work for a short time in collaboration with UK scientists on genebanking.

Research into the after-ripening processes in one of the rare *Dryandra* species is nearing completion and it appears that the use of ethylene as an artificial ripening agent is of little value for this species. A short paper has been submitted on results achieved from research into seed set in nine rare and poorly known *Verticordia* species of the south-west.

Preliminary studies to assess the response of *Banksia brownii* and a desert acacia to storage in liquid nitrogen (-196°C) have been conducted. The response for both species has been encouraging and further testing will be carried out over the following months (if time and money permit).

A part-time research consultant is currently employed for 10 months to assist with collections and laboratory testing of seed. It is hoped that continued research into seed storage and seed germination and dormancy breaking mechanisms for the south western flora will assist our knowledge of seed biology and enhance the overall effectiveness of the operation of the TFSC.

Research into the after-ripening processes in one of the rare *Dryandra* species is nearing completion and it appears that the use of ethylene as an artificial ripening agent is of little value for this species. A short paper has been submitted on results achieved from research into seed set in nine rare and poorly known *Verticordia* species of the south-west.

Preliminary studies to assess the response of *Banksia brownii* and a desert acacia to storage in liquid nitrogen (-196°C) have been conducted. The response for both species has been encouraging and further testing will be carried out over the following months (if time and money permit).

A part-time research consultant is currently employed for 10 months to assist with collections and laboratory testing of seed. It is hoped that continued research into seed storage and seed germination and dormancy breaking mechanisms for the south western flora will assist our knowledge of seed biology and enhance the overall effectiveness of the operation of the TFSC.