



Royal
Botanic
Gardens
Victoria

THE VICTORIAN CONSERVATION SEEDBANK

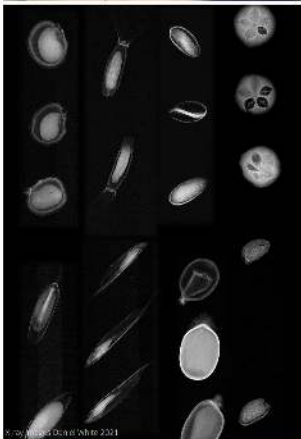
MEGAN HIRST AND DANIEL WHITE

megan.hirst@rbg.vic.gov.au

daniel.white@rbg.vic.gov.au

OUR ROLE

Based at Royal Botanic Gardens Victoria (RBGV), the Victorian Conservation Seedbank (VCS) is Victoria's primary facility for the conservation of the state's most threatened plants. Seeds of native Victorian plants, particularly endemics and at-risk species, are wild collected and securely stored, forming the basis for research into effective long-term germplasm storage, determination of germination characteristics, and the propagation of recalcitrant native species. The VCS currently holds over 2,100 collections covering 1,434 taxa and, with the support of our associated laboratories and plant propagation units, forms part of RBGV's Bushfire Plant Recovery and Care Unit. The unit's role is to safeguard threatened species, preserve their genetic diversity, and support the restoration of fire damaged landscapes and ecosystems.



SEED COLLECTION

Collecting seed from plants in the wild involves adhering to conservation guidelines to ensure all activities undertaken are ethical and sustainable. This means planning ahead to maximise target species, and ensuring the correct permits and site access is approved. When collecting, it is important to inspect the seed to avoid poor samples (predation, immature seed), and collecting no more than 10% of plant material from any one plant.

SEED PROCESSING

When field collections arrive at the seed bank, they are stored in a dehumidifying cabinet set at 15% humidity and 20°C to prevent damage from mildew and herbivory. Seeds are then cleaned down using a combination of sieves and an aspirator. Additional manual cleaning is usually required to remove impurities. The size of each collection is estimated by weight and prepared for viability testing and germination trials.

VIABILITY TESTING

It is important to document the viability rates of our collections before they are stored. We assess viability levels through x-ray imagery, to calculate the proportion of filled seed, followed by germination testing. X-ray imagery allows for rapid assessment of numerous seed and provides a more accurate estimate of seed fill-rates compared with the traditional cut-test method.

GERMINATION TESTING

To test the germination response of our collections we select a small sub-sample of filled seed and place them on a 1% agar medium in standard conditions. (20/15°C). If germination is low, we typically transfer seeds to an agar medium containing Gibberellic Acid (GA3). A positive response to GA3 may indicate a dormancy mechanism in place. We then strive to untangle specific dormancy mechanisms using physical, chemical or thermal cues that are relevant to a species' natural environment. To investigate thermal cues we use a thermogradient plate which allows us to test germination responses under a broad range of temperatures and photoperiod (12 hour light/dark). The image to the right is *Leucochrysum albicans* subsp. *tricolor* seed showing changes in the germination response over time. The larger the circle, the greater the germination recorded on that day (Day 4, 7, 12, & 14), and the period of light.

SAFEGUARDING SEEDS FOR THE FUTURE

The VCS was established in 2005 as part of RBG Kew's Millennium Seed Bank (MSB) partnership, with the goal of safeguarding the world's most threatened plants. We are a member of the Australian Seed Bank Partnership, an alliance of 13 organisations all contributing to *ex situ* seed conservation. Our orthodox seed collections are stored in -20°C conditions in heat-sealed foil envelopes. As a failsafe, duplicates of these collections are sent to the MSB for inclusion in their facility.

BUSHFIRE RECOVERY

A major focus of the VCS is collection of seed from threatened Victorian taxa that are at risk of extinction or significant decline due to increasing bushfire occurrence. The Bushfire Biodiversity Response and Recovery program is an ongoing collaborative project between the Victorian Government, RBGV and other agencies, and was initiated in 2020 after the devastating Black Summer bushfires. Since this program began, we have collected seed from over 70 threatened taxa endemic to the fire affected regions of eastern Victoria along with over 65 taxa in the form of cuttings or other propagation material where no seed could be secured.

