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Conservation seed banking: working to conserve Australia's biodiverse flora

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Seed banking provides invaluable insurance against extinction for individual plant species through the storage of seeds for long-term conservation. The Victorian Conservation Seedbank (VCS) at Royal Botanic Gardens Victoria is part of a network of seedbanks around Australia that collects seed for long-term conservation, research and restoration. The challenge is substantial - Australia is a large, biodiverse continent with more than 21,000 plant species, at least 84% of which are endemic. The increasing frequency and intensity of extreme weather events, continued land clearing and fragmentation of native vegetation, and invasive species are key threats to the persistence of threatened plant species. Here, we present examples of work undertaken by the VCS that highlight the different contributions seedbanks can make to conservation. A detailed study of dormancy and germination requirements among a group of congeneric threatened species from across Victoria demonstrates that germination requirements cannot necessarily be predicted based on relatedness, or similarities in seed traits and species habitat, and highlights the importance of germination research to improve our understanding of species ecologies and recruitment niches, and to enable the future use of banked seed collections. An example of work combining germination studies with field surveys and population genetic analysis to inform the collection and use of seeds for species restoration highlights the importance of genetic diversity in seed collections for on-ground conservation activities. An overview of a collaborative project across the Australian Seed Bank Partnership following the 2019-2020 Australian mega-fires demonstrates the importance of collaboration, resourcing and community engagement. Flora assessments of bushfire impacts, seed collections from fire-affected areas, and germination research over several seasons provided data about species recovery and secured seeds for long-term storage across Australia. This work continues to inform actions in fire-affected areas, as well as proactive conservation management for species at risk from future fires.