

Conservation genetics at Royal Botanic Gardens Victoria

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Conservation genetics contributes to safeguarding biodiversity and maintaining healthy populations by understanding and managing genetic variation within species. Preserving genetic diversity is important for maximising evolutionary resilience to environmental stressors such as climate change. At the Royal Botanic Gardens Victoria (RBGV), we are using genetics to guide on ground management, germplasm collections and *ex situ* breeding. Conservation genetic results inform conservation strategies to optimise protection of genetic diversity in the wild and inform germplasm collections to establish a cultivated *ex situ* population and seed bank that represents available genetic diversity. After recent widespread bushfires we undertook genetic analysis of a number of rare or threatened plant species impacted by bushfires. These evaluations identify the levels of genetic diversity in remnant populations and how that diversity is structured across the landscape. These results can identify important populations for *in situ* management and identify the best source populations for *ex situ* collections at the RBGV. Working with the Victorian Conservation Seedbank (VCS) at the RBGV, genetics is being used to assess historical seed collections to determine if there is diversity present in the seed bank that is no longer present in wild populations. With the Orchid Research Group (ORG) we are using genetics to guide an artificial breeding program as part of the conservation for the Sunshine Diuris (*Diuris fragrantissima*) a nationally endangered orchid that exists largely in *ex situ* cultivation. We will give an overview, with examples, of how conservation genetics is being used at RBGV to guide conservation programs.