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Horticultural rescue leads to a conservation breakthrough for the threatened Tuggeranong Lignum

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Living plant collections can play an important role in the conservation of threatened plant species. In particular, 'exceptional' plant species, which aren't suited to conventional seed banking, may particularly benefit from alternative *ex situ* conservation methods including long-term living plant collections. Tuggeranong Lignum (*Muehlenbeckia tuggeranong*) is one of Australia's rarest plant species, with only a handful of plants remaining in the wild, no has recruitment has ever been recorded and there is very little information about the species. The Australian National Botanic Gardens (ANBG) nursery horticulturists and National Seed Bank scientists, in partnership with the ACT Government, have been undertaking pioneering work to bring the species back from the edge of extinction. Over the last decade, the ANBG developed a breeding program that aims to replicate wild clones of the plant as a back-up insurance population. Genetic analysis suggests the *ex situ* collection consists of ten genetic lineages (six female and four male) and includes lineages that may no longer be present in the wild. Recently, the ANBG produced the first viable seeds of this species ever observed, and successfully germinated seeds in the nursery. To further understand the germination requirements, ANBG seed scientists investigated the seed anatomy, water permeability and germination pre-treatments. Results suggest that *M. tuggeranong* fruits have a mechanical dormancy whereby the pericarp restricts radical emergence physically and/or chemically. Maximum germination remained below estimated seed viability suggesting more work is needed to uncover optimal germination requirements. Botanic gardens are uniquely positioned to secure threatened species through integrated horticultural and seed science research. Here, we present a case study that demonstrates the value of combining living collections and seed biology research for the conservation of a highly exceptional species.