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Saving seeds in storage: identifying exceptional species from new and legacy seed collections

E.L. Dalziell[1,2,*], S. Balasupramaniyam[1,3], R. Jonas[1,2], L. Murfit[1,2], E. Kitto[1,2], P.C. Withers[2], F.R. Hay[4], and D.J. Merritt[1,2]

[1]Kings Park Science, Department of Biodiversity Conservation and Attractions, Kings Park, Western Australia, Australia
[2]School of Biological Sciences, University of Western Australia, Crawley, Western Australia, Australia
[3]College of Science, Health, Engineering and Education, Murdoch University, Murdoch, Western Australia, Australia
[4]Department of Agroecology, Aarhus University, Slagelse, Denmark

[*]Corresponding author email: emma.dalziell@dbca.wa.gov.au

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The storage of seeds in seed banks is a primary strategy for plant conservation in the face of unprecedented biodiversity loss. For seeds of wild species, the effective and evidence-based curation of seed collections is an ever-increasing challenge as the size and diversity of the collections grow. Recent and mounting evidence indicates the viability of stored seeds of many species declines more rapidly than anticipated. Identifying short-lived seeds is a high priority to ensure that *ex situ* conservation programs effectively conserve the germplasm of these species and support species and ecosystem recovery. The Seed Science team at Kings Park and Botanic Gardens (Western Australia) has been focused on identifying "exceptional" species (short-lived seeds or those with non-orthodox storage behaviour) and predicting their seed longevity to inform and improve the management of conservation seed banks. We have used a suite of approaches to identify exceptional species within the Western Australian flora, focussing on understanding the seed biology and comparative longevity of species from poorly studied regions, along with several new methodological approaches to assess longevity, including: 1) a chronosequence approach to quantify longevity using historical collections in the absence of initial germination and retest data, 2) altering the standard comparative longevity protocol to better match the conditions experienced by seeds in the bank, 3) measuring seed metabolic rate in artificially and naturally aged seeds and 4) assessing RNA integrity over time in storage. By increasing our knowledge of the seed biology and storage behaviour of wild, Western Australian species in conjunction with utilising the latest tools and technologies, we aim to inform the effective curation and management of these irreplaceable seed collections to support our conservation goals.