

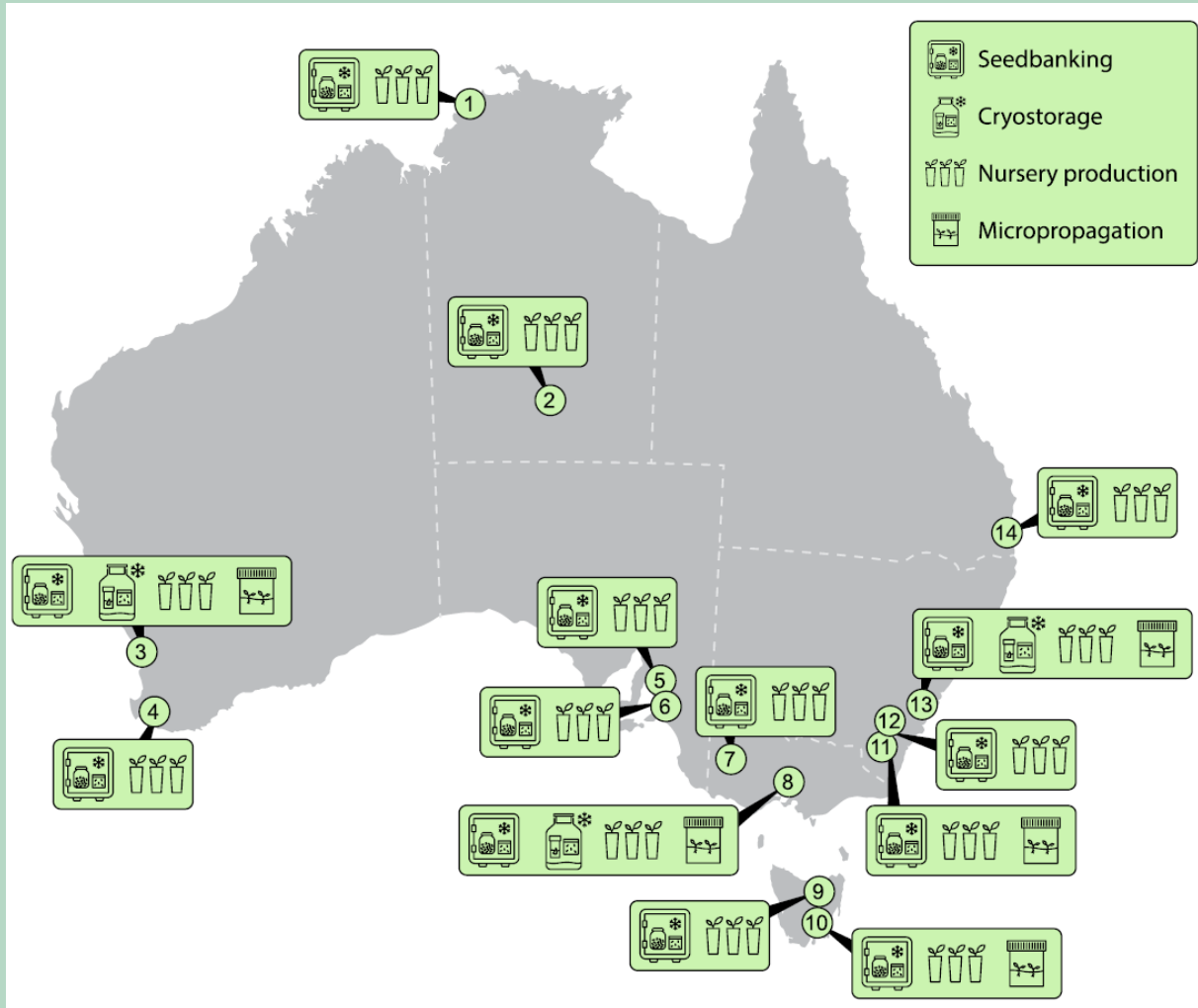


Exceptional species conservation in Australia

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Kings Park Science



Ex-situ conservation efforts around Australia



- Australia is home to a rich and diverse flora estimated to include more than 21,000 species
- 1,411 species currently nationally listed as threatened
- 14 facilities around Australia working on ex-situ conservation



Identifying exceptional species



- Recent publication identified 249 exceptional species in Australia

EF	Species
EF1	37
EF2	64
EF3	87
EF4	61

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OPINION

Plants People Planet PPF
Conservation

Ex situ germplasm collections of exceptional species are a vital part of the conservation of Australia's national plant treasures

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Societal Impact Statement

Conservation seed banks maintain collections of many seed-bearing plant species, providing germplasm and data to support management of wild populations. However, a proportion of plant species produce seeds that are difficult to collect, dry, store and utilise; these are known as 'exceptional' species. Here we tested a framework for identifying exceptional species, to document examples and provide case studies within the Australian flora. We present a workflow that may be used to identify additional exceptional species, and direct efforts to establish appropriate collection types (seeds and/or living collections, tissue culture or cryopreservation) for their ex situ conservation.

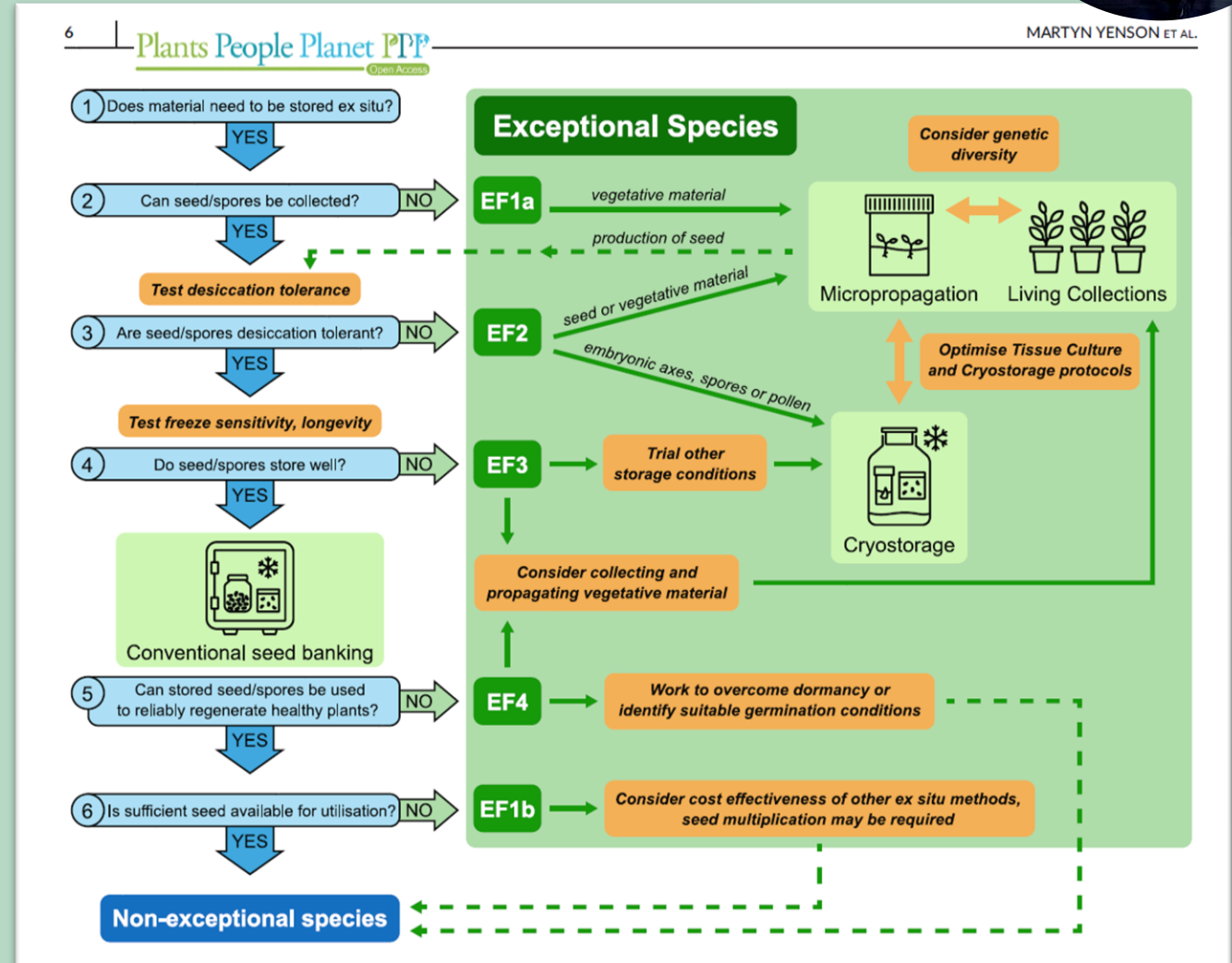
Summary

Seed banking is well established to contribute to the conservation of many seed-bearing plant species ex situ for future use in restoration, translocation, agriculture



Working with exceptional species

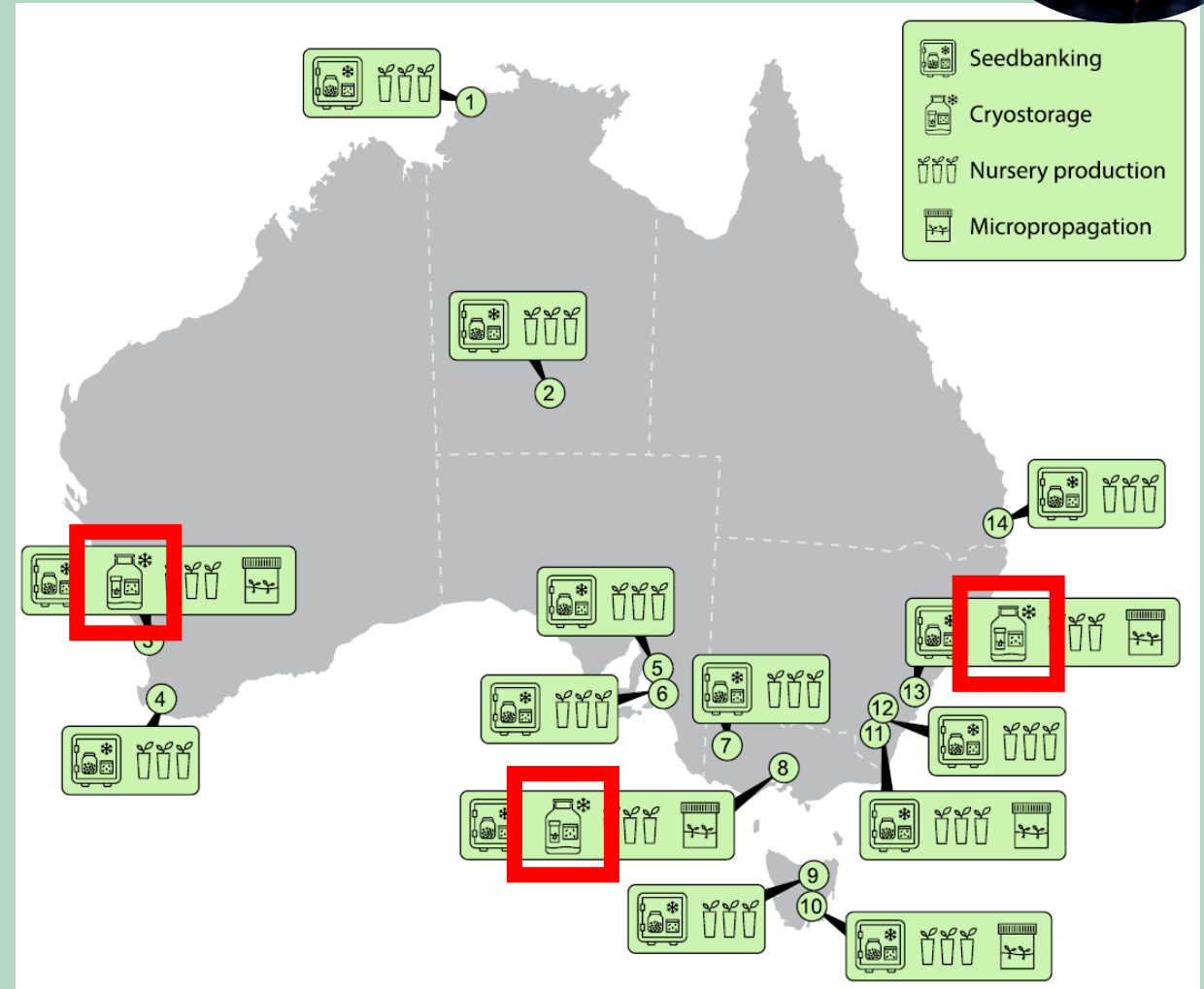
A framework was developed for identifying exceptional species and how best to conserve them





Cryostorage facilities

- Only three facilities around Australia have long-term liquid nitrogen storage facilities focused on conserving exceptional species
 - Australian PlantBank, Botanic Gardens of Sydney
 - Victorian Conservation Seedbank, RBG Victoria
 - Kings Park and Botanic Garden, DBCA





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Our progress in conserving exceptional species



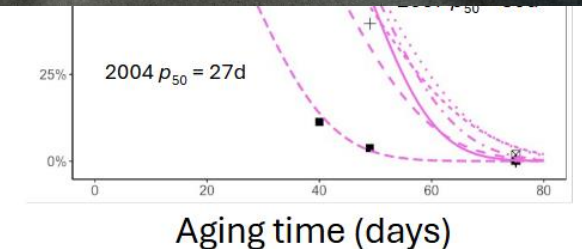
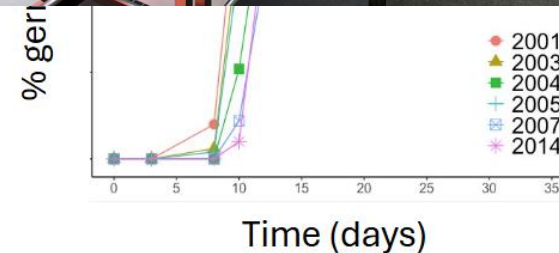
Our exceptional species collection



In vitro cultures

- 44 species currently growing in our TC collection
 - 30 Threatened species
 - 11 exceptional species
 - 6 EF1, 3 EF2, 1 EF3, 1 EF4

Seeds



Cryogenic collections



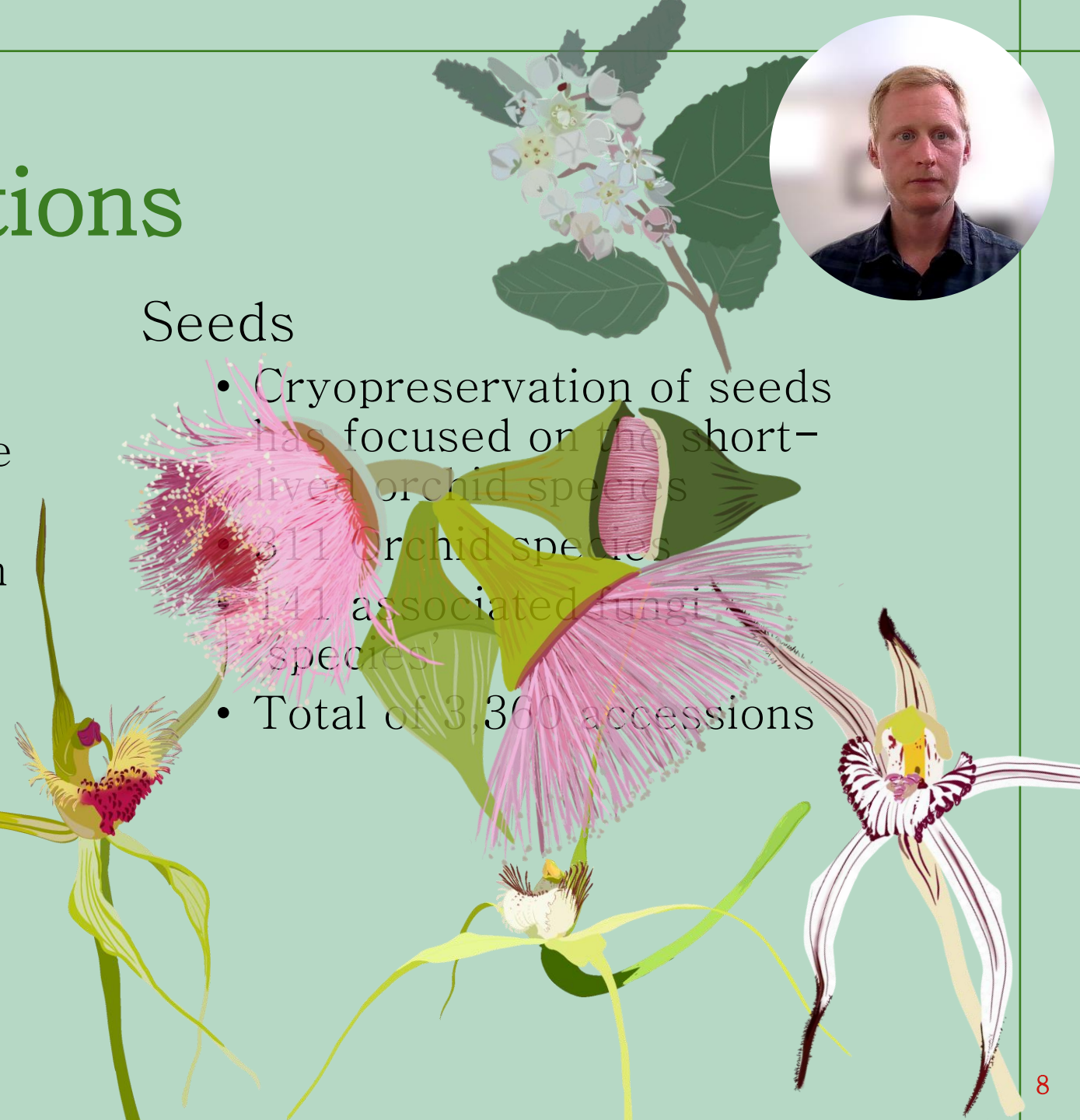
Shoot tips

- Shoot tips are the primary germplasm used to cryopreserve the tissue cultured plants
- Vitrification protocols have been the most successful for our Australian species

Species Stored	Accessions Stored	Total vials	Total Propagules
47	163	1983	22,574

Seeds

- Cryopreservation of seeds has focused on the short-lived orchid species
- 311 orchid species
- 141 associated fungi species
- Total of 3,360 accessions



Cryobiotechnology Research



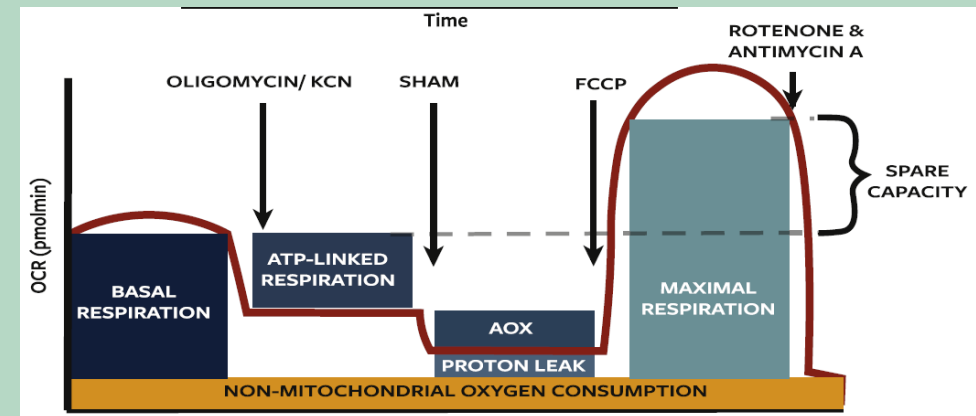
Protocol development

- New protocols can significantly improve regrowth after cryogenic storage



Research into fundamental aspects affecting survival

- Oxidative stress
- Cryoprotective agent toxicity
- Cellular respiration and mitochondrial function



Focus on species affected by Myrtle Rust

- Myrtle rust is a plant disease which was first introduced into Australia in 2010
 - Myrtle rust has had a devastating impact on many native species in NSW and QLD, including several species now at risk of extinction.
- Detected in the remote Kimberley region of Western Australia
- Research urgently needed for how best to conserve these species



Thank you

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Department of Biodiversity,
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Australian Government

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We acknowledge and respect the Whadjuk Noongar people as the traditional custodians of the land on which this work was conducted