



Ex situ seed banks are a good investment as small deposits drive big returns

Damian Wrigley
National Coordinator
November 2018



Our vision is a future where native plant diversity is valued, understood and conserved for the benefit of all.





- The Council of Heads of Australian Botanic Gardens Inc.
- Not for profit organisation
- Business Plan 2011-2020
- National Steering Committee
- National Coordinator





MILLENNIUM
SEED BANK
PARTNERSHIP



GEORGE BROWN
DARWIN
Botanic Gardens



Dedicated to a better Brisbane



Department of
Biodiversity, Conservation
and Attractions



Australian Network for
Plant Conservation Inc



The Royal
BOTANIC GARDENS
& Domain Trust

Greening Australia



AUSTRALIAN NATIONAL
BOTANIC GARDENS



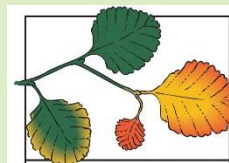
BOTANIC GARDENS
& PARKS AUTHORITY



Government
of South Australia



Board of the
Botanic Gardens and
State Herbarium



Royal
Tasmanian
Botanical
Gardens



ROYAL
BOTANIC GARDENS
VICTORIA

Partners



Centre for Australian
National Biodiversity Research



SOCIETY FOR
ECOLOGICAL
RESTORATION



ATLAS OF **LIVING**
AUSTRALIA
sharing biodiversity knowledge



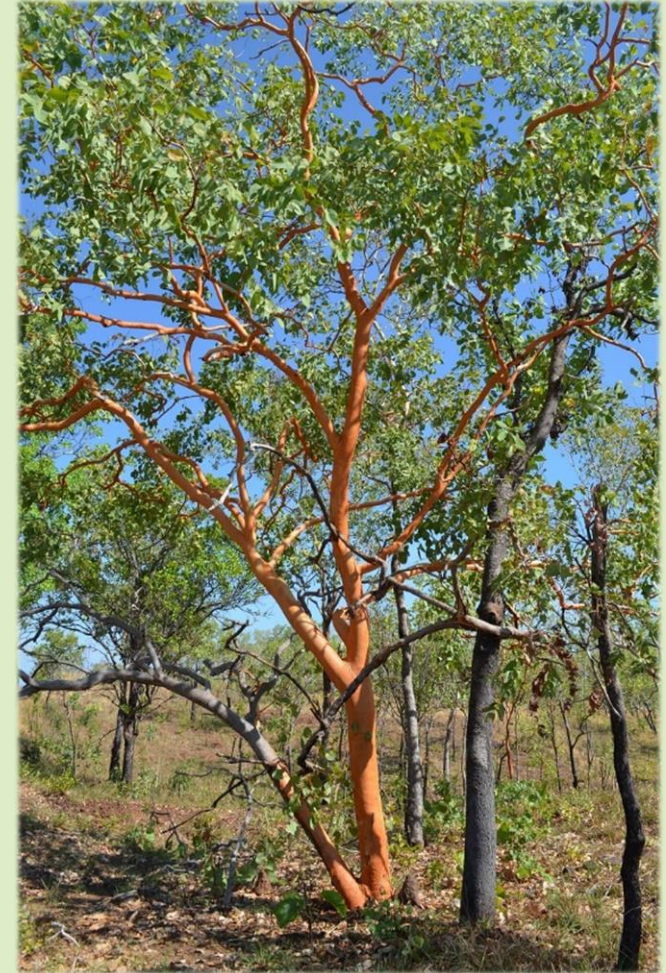
Australian Government

Department of the Environment and Energy

Associates

Global Strategy for Plant Conservation

- 16 Targets to guide plant conservation
- Target 8 and 9
- Flexible framework
- Botanic Gardens and Parties to CBD
- Post-2020 biodiversity framework



Eucalyptus tintinnans, GBDBG

Global Strategy for Plant Conservation

Overview of progress towards the GSPC targets in a selection of countries

Country	Target 1	Target 2	Target 3	Target 4	Target 5	Target 6	Target 7	Target 8	Target 9	Target 10	Target 11	Target 12	Target 13	Target 14	Target 15	Target 16
Bahamas	Green	Yellow	Yellow	Yellow	Red	White	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Green	Green
Brazil	Yellow	Red	Yellow	Red	Yellow	White	Green	Red	White	Red	Red	Red	Red	White	Red	Green
Canada	Green	Green	Green	Yellow	Red	Yellow	Yellow	Red	Red	Green	Green	Red	Yellow	Green	Red	Yellow
China	Green	Green	Green	Green	Green	Yellow	Green	Green	Green	Yellow	Yellow	Yellow	Yellow	Green	Yellow	Green
France	Green	Green	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Green
Indonesia	Yellow	Yellow	Green	Yellow	Red	Green	Green	Green	Yellow	Green	Green	Yellow	Yellow	Green	Green	Yellow
Jamaica	Yellow	Yellow	Yellow	Yellow	Yellow	White	Red	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Madagascar	Green	Green	Yellow	Green	Green	Yellow	Red	Yellow	Red	Red	Yellow	Yellow	Red	Red	Yellow	Yellow
Malaysia	Green	Red	Green	Green	Green	Green	Red	Red	White	White	White	Green	Green	Yellow	Red	Green
Mexico	Green	Yellow	Yellow	Yellow	Green	Red	Yellow	Red	Red	Green	Yellow	Red	Red	Green	Yellow	Yellow
Mozambique	White	Yellow	Yellow	Red	Red	Red	Red	White	Red	Red	Yellow	Yellow	Yellow	Yellow	Yellow	Yellow
Serbia	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Red	Red	Red	Green	Green	Red	Yellow	Yellow	Yellow
Slovakia	Yellow	Green	Red	Green	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Yellow	Yellow	Red	Yellow	Yellow	Yellow
South Africa	Green	Green	Green	Yellow	Yellow	Yellow	Green	Yellow	Yellow	Yellow	Green	Red	Green	Green	Green	Green
Hawaii	Green	Yellow	Yellow	Yellow	Yellow	White	Green	Green	Green	Green	Yellow	White	White	Yellow	Yellow	Green
			Key:	Green	More than 65% progress			Yellow	30-60% progress		Red	less than 30% progress				

Millennium Seed Bank Partnership

- The Millennium Seed Bank Partnership is the largest plant conservation program in the world
- Operating in over 84 countries with more than 200 partner organisations
- Follows an integrated conservation strategy – *ex situ* long term conservation of seeds supporting *in situ* conservation actions
 - CHABG has resigned an MoC for 2018-2023 to continue to participate in the MSBP



MILLENNIUM
SEED BANK
PARTNERSHIP



MSBP Seed Conservation Standards



GBDBG

MSBP Seed Use Survey 2018



Eucalyptus johnsoniana, DBCA

- MSBP perform an annual survey of partners on all aspects of seed banking
- International seed use is following similar trends

- Annual use of collections - focussed on Botanic Gardens, habitat restoration and seed science.

Kew's Science Collections Strategy

- First scientific collections strategy in Kew's history
- New collections must be purposeful
- What and how collections are made must evolve with emerging technologies
- Stakeholder must be able to access collections



Australian Context



Acradenia frankliniae, RTBG

- Partner Institutions
- Australian Government
- Millennium Seed Bank Partnership
- Fieldwork Funds
- Global Trees
- C4 Photosynthesis
- *P. cinnamomi*, *A. psidii*
- Crop Wild Relatives

Phytophthora cinnamomi

- Genetically diverse collections from species impacted by *P. cinnamomi*
- Collecting in four states
- Secured 60 collections of 27 taxa
- Seed orcharding and restoration



Prosanthera eurybioides, BGS

Western Australian Threatened Flora Seed Centre



Verticordia spicata ssp. *squamosa* (DBCA)



Banksia brownii (DBCA)

PlantBank, Australian Botanic Garden

- *Persoonia pauciflora*



- Experimental plantings within and outside of native range
- Vegetative propagules vs seedlings
- 1000 plants with 70% survival rate
- Project stewardship of local community

South Australian Seed Conservation Centre

- Project in the swales and swamps of Mt Lofty Ranges
- Seed orchards and translocations
- Germination research



Eryngium ovinum SASCC

Victorian Conservation Seedbank

Ballantinia antipoda



- RBGV orcharded 20,000+ seedlings
- Seeds germinate after sowing given good rains
- Successive sowings may build-up soil/moss seed bank
- Good site selection and future spring rain

RBGV

WA Seed Technology Centre

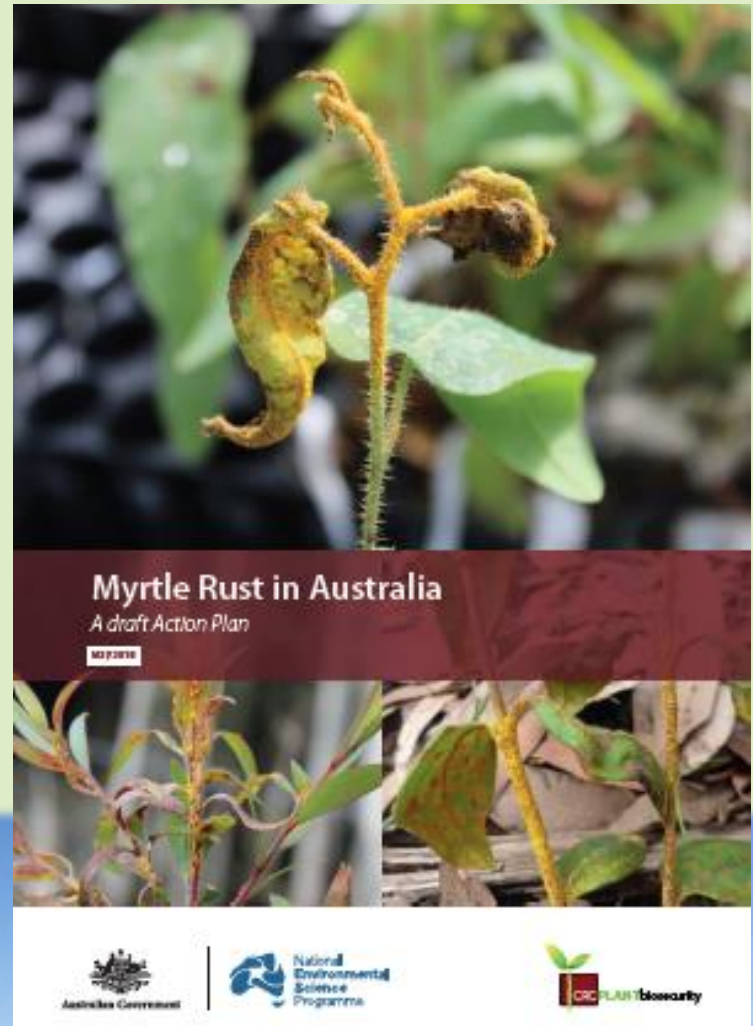
- *Androcalva perlaria*
- Limited extant populations over narrow geographic range
- Mining, land degradation and climate change
- Translocations across two locations over time
- Different treatments and considered site selection



Sclerolaena fontinalis JRG335 Fruit



Sclerolaena fontinalis, BGS



Gavin Phillips in the field, RBGDI²⁰



Plectranthus acariformis, BBG

Sharing Knowledge

Seed conservation techniques training
New Zealand – Dec 2017 – BBG and RBGDT



Wellington and Auckland Seed Conservation Techniques Training. Image: MSBP

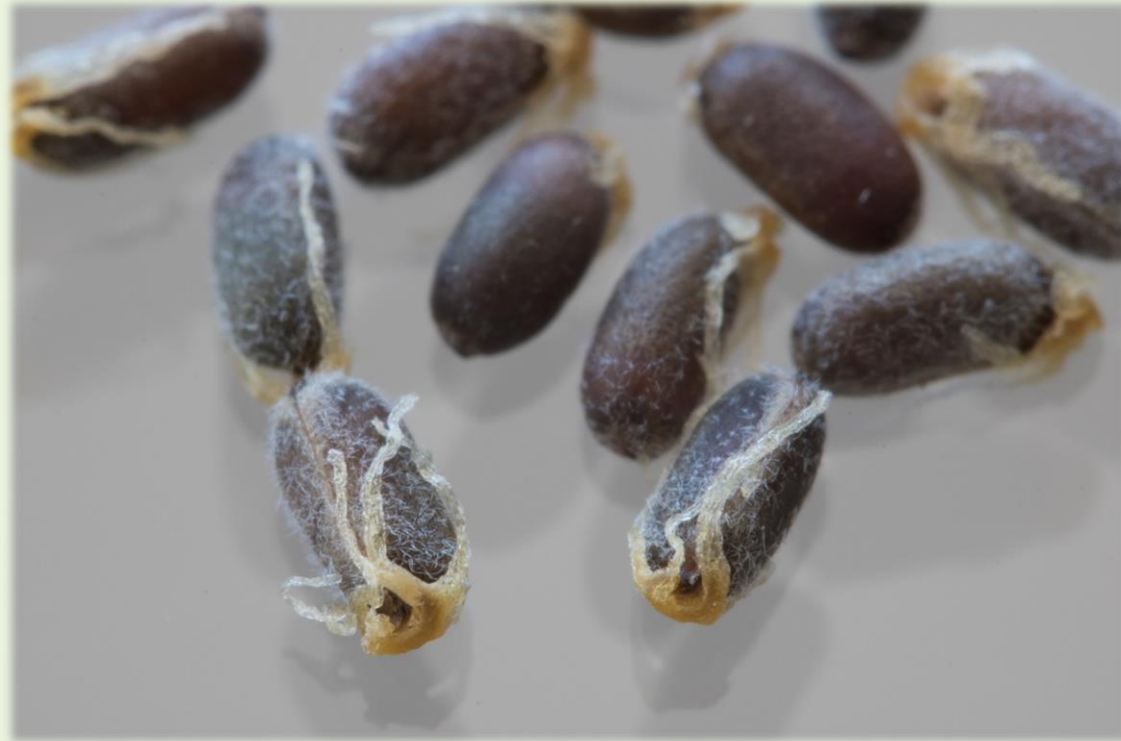
Germination and Dormancy challenges

- Collections tested for viability & most are available for research or restoration.
- Seed dormancy continues to be a challenge
- Availability of germination protocols continues to be a focus



A diversity of annuals near Ninghan, WA, BGPA

Science and Research



Lasiopetalum moullean, Dr Andrew Crawford,
DBCA

- National Seed Science Forum synthesis
- Saving rainforest seeds of S.Pacific
- Seed dormancy and germination
- Seed based tech for restoration
- Understanding and responding to weed invasions

Seed Science and Research

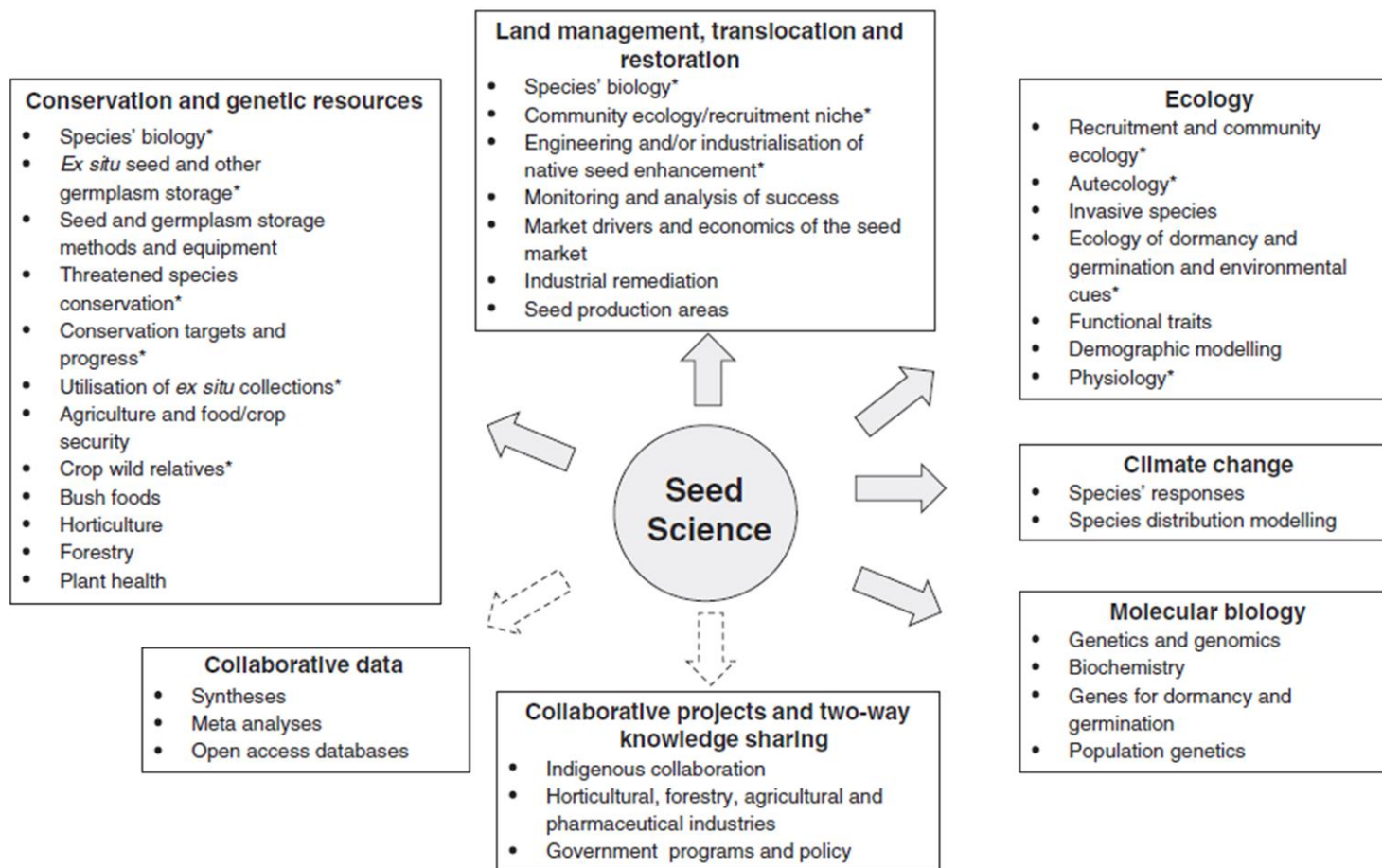


Fig. 1. Conceptual diagram demonstrating that seed science, and the cross-cutting themes of the National Seed Science Forum (1) Dormancy and Germination; (2) Establishment and Management; (3) Seed Storage, Conservation and Utilisation and; (4) Seed Ecology, are fundamental to many fields covered in this special issue (*), and to many other areas of research that are new and emerging, or already published elsewhere (arrows with continuous borders). Future advances across all of these areas will most likely involve greater synthesis and accessibility of data, and engagement and collaboration across multiple sectors (arrows with dashed borders) – with seed science in Australia remaining at the forefront.

National Seed Science Forum

Hosted at PlantBank in 2016

To be hosted by Australian National Botanic
Gardens in 2020

National and International seed scientists

Germplasm conservation of native and agricultural
floras and the future priorities for seed science



Safeguarding Australia's Flora
through a national network of native plant seed banks

2017-18 ANNUAL REPORT

Annual Report 2017-2018

Available on the ASBP website

www.seedpartnership.org.au/about/reports



www.seedpartnership.org.au



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