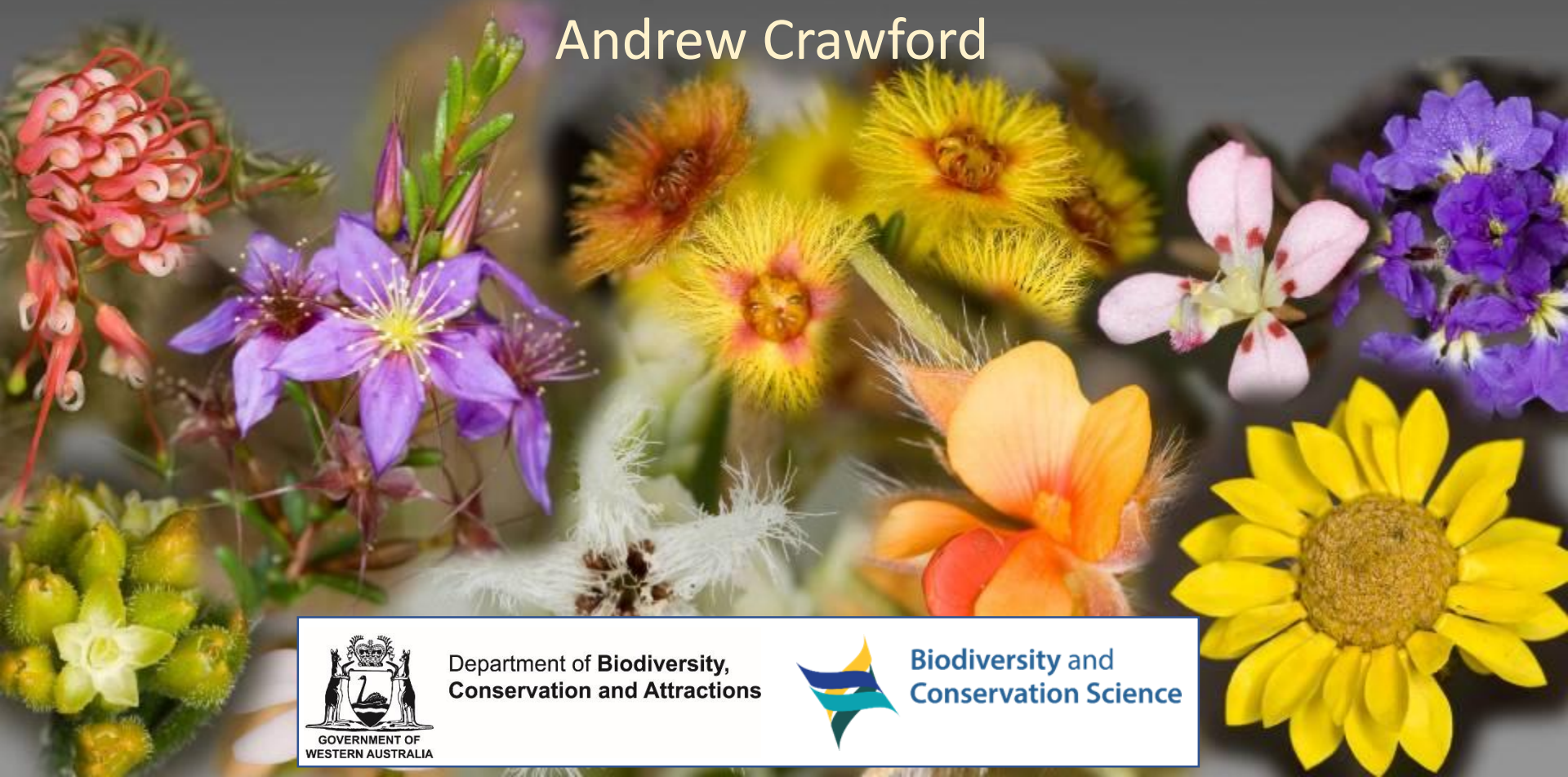


Collecting and storing seed of Threatened flora for translocation

Andrew Crawford



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Conservation and Attractions**



**Biodiversity and
Conservation Science**



Australian Network for
Plant Conservation Inc



Guidelines for the Translocation of Threatened Plants in Australia

Third Edition

Editors: L.E. Commander, D.J. Coates, L. Broadhurst,
C.A. Offord, R.O. Makinson and M. Matthes



Natural Environmental Science Programme



Information presented
can be found in chapters
3, 4, and 6 of the
translocation guidelines

Plant Germplasm CONSERVATION in Australia

*strategies and guidelines
for developing, managing and utilising
ex situ collections*



Edited by Catherine A. Offord and Patricia F. Meagher



The Australian Network for Plant Conservation (ANPC) in partnership with
Australian Seed Conservation and Research (AuSCaR)



For more detailed
information refer to the
plant germplasm
conservation guidelines

What makes a good seed collection?



- Knowing what to collect & why
- Known plant identity & good collection data
- Genetically representative sample
- Collection does not impact population
- Seed is viable
- Stored under conditions that will optimise longevity

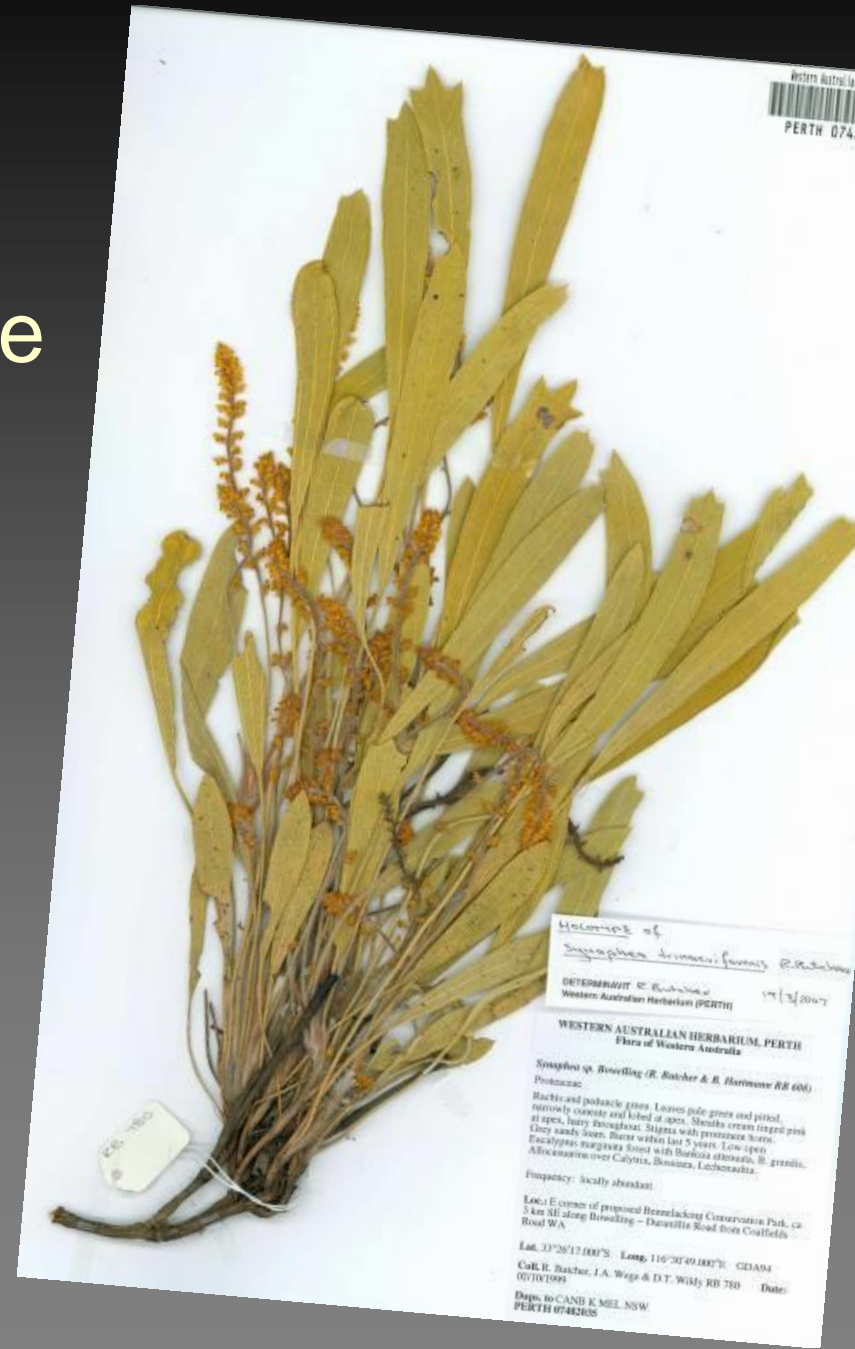
Knowing what to collect and why

- If a decision has been made to translocate this question has already been addressed
- Ideally, seed is collected prior to the need for translocation



Known plant identity

- Before collection is made
 - Species descriptions
 - Specimen images
 - Photos/illustrations
- When the collection is made
 - Voucher specimen



Good collection data



FIELD NO. _____
COLLECTOR No. _____
LOCATION _____

LATITUDE: _____ °N LONGITUDE: _____ °E

HABIT: Climbing Prostrate Decumbent Erect Compact Open Succulent Rhizomatous
Climber Bulbous Tuberosus Floating Submerged Aerial Pinnatifid

FORM: Tree Maize Shrub Dwarf Shrub Herb Grass Sedge Lily Halophyte Epiphyte
PHENOLOGY (if available): Vegetative Bud Flower (colour) _____
Immature fruit Fruit Dehiscent

BARK COLOUR: Green Grey Red Orange Brown Yellow White Other _____
BARK TEXTURE: Hard Soft Smooth Rough Fibrous Flaky Papery Stringy Powdery
Corky Flak

LEAVES: Present Absent Minirhizic Hairy Other _____
Leathery Other _____

LANDFORM: Hill Slope Valley Swamp Ridge
Flat Outcrop Plain Gully Riverbank Sand Dune
Drainageline Lake Edge Other _____

ROCK TYPE: Laterite Granite Fluvial Other _____

ROCK FORM: Sheet Boulder Fluvial Other _____

SOIL TYPE: Sand Loam Clay Peat Secretory Gravel

SOIL COLOUR: Red Brown Yellow White

SOIL CONDITION: Inundated Moist Dry Saline

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: _____ Area Occupied: _____ No. PLANTS COLLECTED: _____
COLLECTION NUMBER (seed): ADC _____ VOUCHER SPECIMEN: ADC _____ Duplicate for Kew
PHOTO No's: _____

Good collection data

- Species name
- Date
- Collectors
- Seed collection ID
- Voucher specimen ID
- Location – Lat/long's
- No. plants in population
- No. plants collected
- Species description
- Habitat description
- Associated species
- Landform description
- Soil type
- Health of population

FIELD NO. _____ DATE _____

COLLECTOR(S) _____

LATITUDE: _____ LONGITUDE: _____

HABIT: Climbing Prostrate Decumbent Erect Composite Open Succulent Rhizomatous
Climber Bulbous Tuberosus Floating Submerged Annual Perennial

FORM: Tree Maize Shrub Dwarf Shrub Herb Green Sedge Lily Halophyte Epiphyte

PHENOLOGY (check all that apply): Vegetative Bud Flower (colour) _____
Immature fruit Fruit Dehiscent

BARK COLOUR: Green Grey Red Orange Brown Yellow White Other _____

BARK TEXTURE: Hard Soft Smooth Rough Fibrous Flaky Papery Stringy Powdery
Corky Fissile Glandular Miniritchie Hairy Other _____

LEAVES: Present Absent Miniritchie Hairy Other _____
Leathery Other _____

LANDFORM: Hill Slope Valley Swamp Ridge
Flat Outcrop Plain Gully Riverbank Sand Dune

ROCK TYPE: Laterite Granite Other _____ ASPECT: _____

ROCK FORM: Sheet Boulder Fluvial Stone Other: _____

SOIL TYPE: Sand Loam Clay Peat Secretory Gravel

SOIL COLOUR: Red Brown Yellow White

SOIL CONDITION: Inundated Moist Dry Saline

VEGETATION CLASSIFICATION (Muir's): _____

ASSOCIATED SPECIES: _____

No. of PLANTS: _____ Area Occupied: _____ No. PLANTS COLLECTED: _____

COLLECTION NUMBER (seed): ADC _____ VOUCHER SPECIMEN: ADC _____ Duplicate for Kew

PHOTO No's: _____

Genetically representative sample



- How many individuals?
 - Theory based on collecting 95% of the most common alleles in a population
 - Depends on breeding system

Genetically representative sample

Breeding system	No. of individuals
outbreeding species	30
inbreeding species	59
not known < 50 individuals	from all individuals
not known > 50 individuals	at least 50



Genetically representative sample

- Sampling strategy
 - Plants should be collected randomly from across the population without biasing any individual



Ideally keep
seed from each
plant separate



Genetically representative sample - populations

- Aim to capture diversity of species between populations
 - If > 50 populations sample 50
 - If < 50 populations sample all
- In the first instance target the largest
- Need to consider which collections can be mixed for translocation

Collection does not impact population

- Use least damaging collection method possible
- Take no more than 20% of seed
 - based on a ‘once off’ collection
- Harvesting 10% of seeds in 10% of years (or less) is generally safe.
- Less intense, frequent harvests are safer than more intense, infrequent harvests.



Hygiene

- Avoid introducing/spreading weeds or diseases
 - clean equipment and vehicles between collections or sites.



Seed is mature and viable

- Prior to collection
- Indicators of seed/fruit maturity
 - Seed/fruit beginning to be dispersed
 - Changes in fruit colour
 - Changes in seed coat colour
 - Fleshy fruit going soft
 - Seed 'rattling' inside fruit

There are always exceptions!



Assessing seed maturity and viability

The cut test

- Check to see if inside of seed is firm, fresh and healthy
- Viable seeds usually firm and white



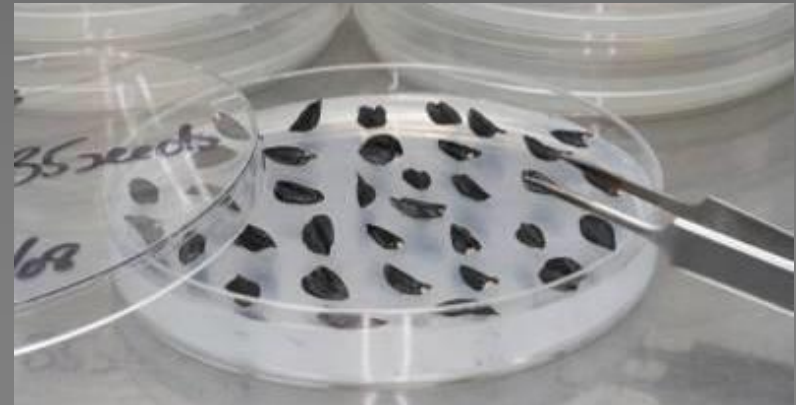
Seed viability

- After collection

Viability tests – all destructive

e.g.

- Cut test
- Staining
- Germination



- For threatened species seed is often limited
- Seed needs to be used judiciously
- Germination test gives estimates of seed viability as well as plants that can be used for translocation



Seed storage

- Two main factors that affect seed longevity
 - Temperature
 - Seed moisture content
- Current recommendations for long-term storage
 - Dry seed to 15% equilibrium relative humidity
 - Store at $\leq -18^{\circ}\text{C}$



Don't forget there will be a tour of the seed centre at lunch

