Plant Treasures - in conversation

Data collection and record keeping in ex situ collections

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Overview and tips from *'Plant Germplasm Conservation in Australia'*

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Ex situ conservation collections

Conservation collections have 3 components, all critical for maintaining scientific and conservation integrity/ collection value:

- germplasm (seeds, cuttings, plants),
- herbarium voucher specimen,
- collection data (field data, quality assessments, storage, propagation, distribution, re-testing).

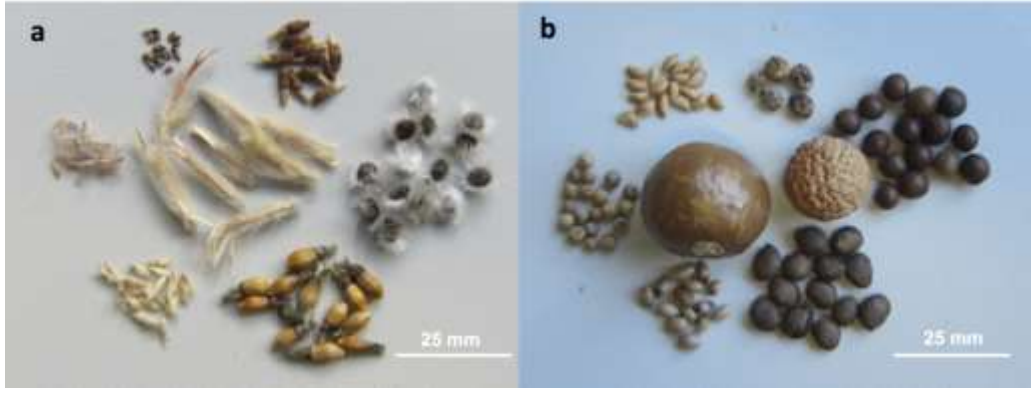

Image: Shane Turner

Image: National Herbarium of NSW

Image: Royal Botanic Gardens and Domain Trust

Botanical voucher specimens

- Confirm identity of seed/cutting collection.
- Align taxonomic changes with collection.
- Future reference: yourself and others.
- Accompanied by field data.
- See Chapter 4 for more details.

Image: National Herbarium of NSW

Collection data: Field data

- Data standards such as DarwinCore provide a set, consistent format.
- Can provide insights into timing of flowering and fruiting, ecology and recruitment strategy.
- Can be useful in assessments of conservation status.
- See Chapter 4 for more details.

Image: N. Tapson

Box 4.7: Example of the basic field information to be collected

TAXON: _____ ACCESSION No: _____

COLLECTOR(S): _____

POPULATION No: _____ CONSERVATION CODE: _____ DATE: ___ / ___ / 20__

LOCATION: _____

_____

_____ DATUM: _____

LATITUDE: _____° _____ ' _____ "S LONGITUDE: _____° _____ ' _____ "E

HABIT: Climbing | Prostrate | Decumbent | Erect | Compact | Open | Succulent | Rhizomatous | Caespitose | Bulbous | Tuberous | Floating | Submerged | Annual | Perennial

FORM: Tree | Mallee | Shrub | Dwarf Shrub | Herb | Grass | Sedge | Lily | Halophyte | Epiphyte

PHENOLOGY (Low/Med/High*): Vegetative | Bud | Flower (colour) | (_____)

Immature fruit | Fruit | Dehisced

LANDFORM: Hilltop | Cliff | Slope | Valley | Swamp | Ridge | Flat | Outcrop | Breakaway Low Plain | Gully | Riverbank | Sand Dune | Drainage line | Lake Edge | Firebreak | Other _____ ASPECT: _____

GEOLOGY: Laterite | Granite | Dolerite | Limestone | Other _____

SOIL: _____

VEGETATION TYPE: _____

ASSOCIATED SPECIES: _____

_____

_____

No. of PLANTS: _____ AREA OCCUPIED: _____ No. PLANTS COLLECTED: _____ Bulk/Ind.

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

PHOTO No's: _____

COMMENTS: _____

_____

_____

* Low = low number fruits, Med = moderate fruit crop, and High = heavy fruit crops

Record keeping for seed collections

- Maintain identity of each individual collection.
  - Possibly even each maternal line.
- Link to voucher specimen and field data; barcodes and QR codes are possible.
- Data collected during curation (cleaning, cut tests, germination, storage). Adds value and can help with future decision making.
- See Chapter 5 for more details.

- TIPS
  - Two identical labels with each collection: one in the seeds and one on outside of bag or on the processing equipment (jar, tray, cleaning equipment).
  - Jeweller's tags with pencil or water-resistant ink are ideal.
  - Return to same container, or thoroughly clean containers before re-use.

Image: Royal Botanic Gardens and Domain Trust

Record keeping for nursery collections

- Maintain identity of each individual collection.
- Good records provide information such as time from propagation to planting out, or maintenance each season.
- Multiple generations may be produced, and plants moved from propagation, to living collections or translocation projects.
- See Chapter 8 for more details.

- TIPS
  - Ideally, link to voucher specimen and field data; barcodes and QR codes are possible.
  - Always use permanent markers and long-lasting UV- and weatherproof labels.
  - Consider long term records: will information be useful? Can someone understand it in 10-20 years if they are not familiar with the species or work?
  - Have a back-up system e.g. images of pots or containers marked with accession numbers, as well as labels in pots. Digital and paper mapping provide additional insurance.

Image: Nathan Emery

Case study: Wollemi Pine records

Old accession tag: embossed aluminium

Additional unique label: engraved by hand into soft aluminium

New accession tag: engraved plastic with metal inlay

Images and info: Maureen Phelan

Record keeping for specialist collections

- Tissue culture: record species, clone/accession, link to field data/voucher specimen, date into culture, subculture number, treatments and medium used.
- See Chapter 9 for more details about tissue culture.

- Cryopreservation: maintenance of records, including paper and electronic records, over a very long period (25 yrs +). Minimise physical access to collections (quick checks). Need to track location and information for each cryovial. Ensure suitable storage vials are used.
- See Chapter 10 for more details about cryopreservation.

Image: Amanda Rollason

Image: Michael Lawrence-Taylor

Data management

- Conservation collections have 3 components: germplasm + herbarium voucher specimen + collection data.
- Correct source material is key for conservation and translocation, may be used many decades after collection.
- Database can be as simple as a spreadsheet or workbook, or a complex data management system.
  - What to record,
  - How long it needs to be stored,
  - Regular back-up,
  - Preference for raw data,
  - Sharing and access to data.

  - More information in Chapter 15.

Figure 15.1: Possible data fields and nested hierarchies of tables in a seed bank database

Image management

- Images and associated metadata (tags, keywords) can capture additional details:
  - General images: photos taken in the field, detail of plants and fruits, lab set-up and germination experiments.
  - Scientific images: microscope or x-ray images, capturing morphological data. Example: https://spapps.environment.sa.gov.au/seedsofsa/

- More information in Chapter 15.

Image: Nathan Emery

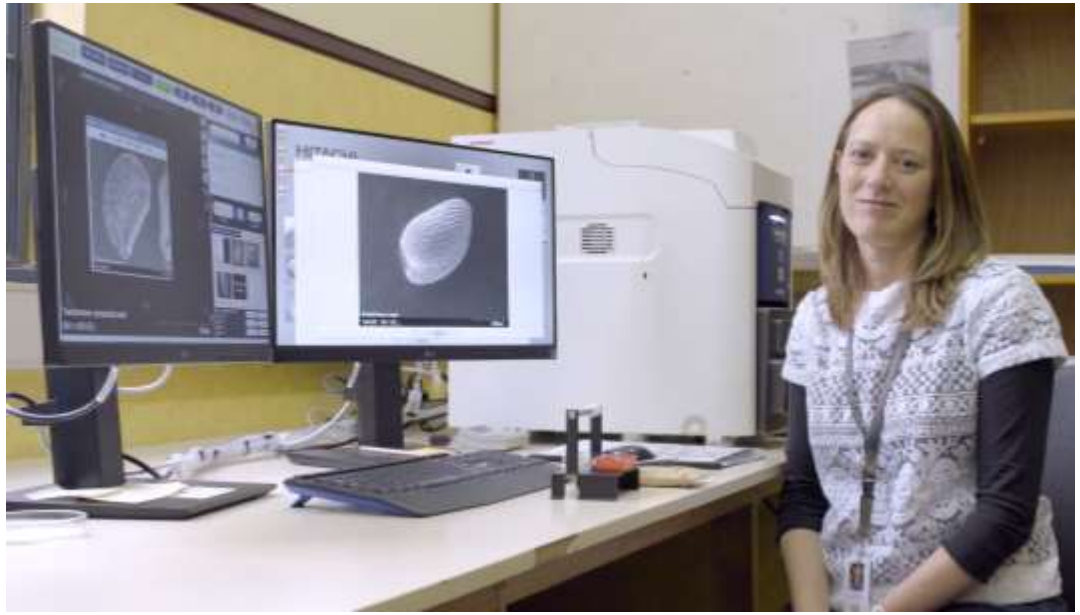

Image: Michael Lawrence-Taylor

Resources

- *Plant Germplasm Conservation in Australia*: https://www.anpc.asn.au/plant-germplasm/
- *Florabank Guidelines for native seed collection and use https://www.anpc.asn.au/florabank/*
- ANPC Publications: https://www.anpc.asn.au/product-category/publications/

- Australian Seed Bank Partnership: https://www.seedpartnership.org.au/
- Search for records in The Australian Seed Bank Partnership: https://asbp.ala.org.au/search#tab_simpleSearch
- Seeds of South Australia: https://spapps.environment.sa.gov.au/seedsofsa/

- Botanic Gardens Australia and New Zealand, particularly Resources: https://www.bganz.org.au/category/resources/

- Australasian Plant Conservation: https://www.anpc.asn.au/apc/
- The BOTANIC GARDENer: Email managing.editor@bganz.org.au for more info

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