

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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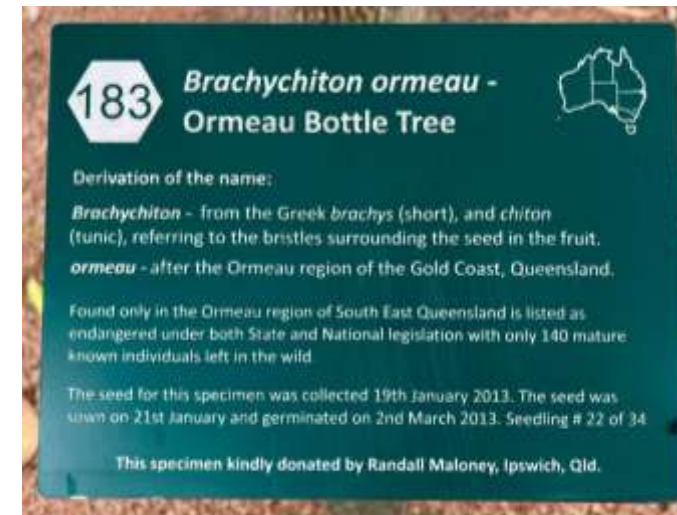
Plant Treasures - in conversation





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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).

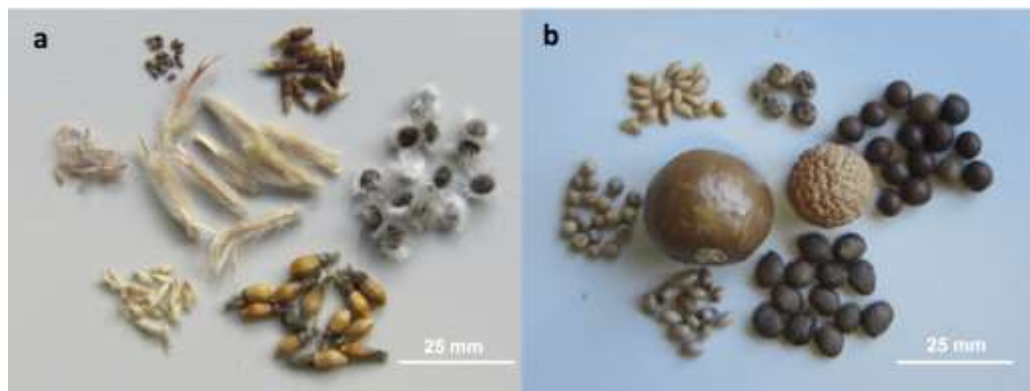


Image: Shane Turner



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



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- 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 | Tuberos | Floating | Submerged | Annual | Perennial

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

PHENOLOGY (Low/Med/High): Vegetative | Bud | Flower (colour) | (_____) | Immature fruit | Fruit | Detached

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

GEOLOGY: Lignite | Granite | Dolomite | 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 plants, Med = moderate number and High = many plants

Record keeping for seed collections



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- 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



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- 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.

| | |
|--------------------------------|---|
| Taxonomic Data ¹ | |
| Family | - Family name, Order |
| Genus | - Genus name |
| Taxa | - Species, Intraspecific rank, Intraspecific epithet, Author, Journal, Endemic |
| Threat Status | - EPBCA, State listing |
| Collections Data ¹ | |
| Field Data ² | |
| | - Accession number, Collector number, Date collected, Date donated, Provenance, Donor type, Distribution policy, Collecting notes, Permit number |
| Collector/s Data | - Collector name/s |
| Geographical Data | - Bioregion, Location details, GPS coordinates, GPS datum, Altitude, Altitude method |
| Ecological Data | - Habitat, Modifying factors, Land form, Land use, Geology, Slope, Aspect, Soil type, Other site notes |
| Associated Flora | - Taxa ³ |
| Harvesting Data | - Material collected, No. plants sampled, No. plants found, % fruiting, Area sampled, Sample notes, Collection weight, Plant condition or Plant health data |
| Specimen Data | - Taxa ³ , Plant type, Avg height, Plant description, No. of herbarium specimens |
| Processing Data ³ | |
| | - Processing notes |
| Storage Fractions ⁴ | |
| | - Sub-accession number, Stored material, % Dabiv, Original quantity, Current quantity, 2000 seed weight |
| Quantity data | |
| Sample Weights | - Weights |
| Collection Quality | - Quality type ⁵ , Quality count |
| Storage History | - Date, Storage conditions |
| Banking | - Bank location, Packet location, Packet quantity |
| Germination Tests | |
| | - Start date, Pre-storage conditions, % Result, % Viability, % Avg result, Passed?, Accepted? ⁶ |
| Test Treatments | |
| | - Step number, Duration |
| Treatments ⁷ | - Treatment name, Temperature range, Thermal period, Photoperiod, Mechanical treatment |
| Media | |
| | - Components, Quantity |
| Test Replicates | - Replicate no., No. sown |
| Scoring | - Days, No. germinated |
| Cut Test | - Quality type ⁵ , Quality count |
| Dispatches ⁸ | |
| | - Date sent, Date received, Recipient, Destination, Dispatch type |
| Collections | |
| | - Accession number, Material type |

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

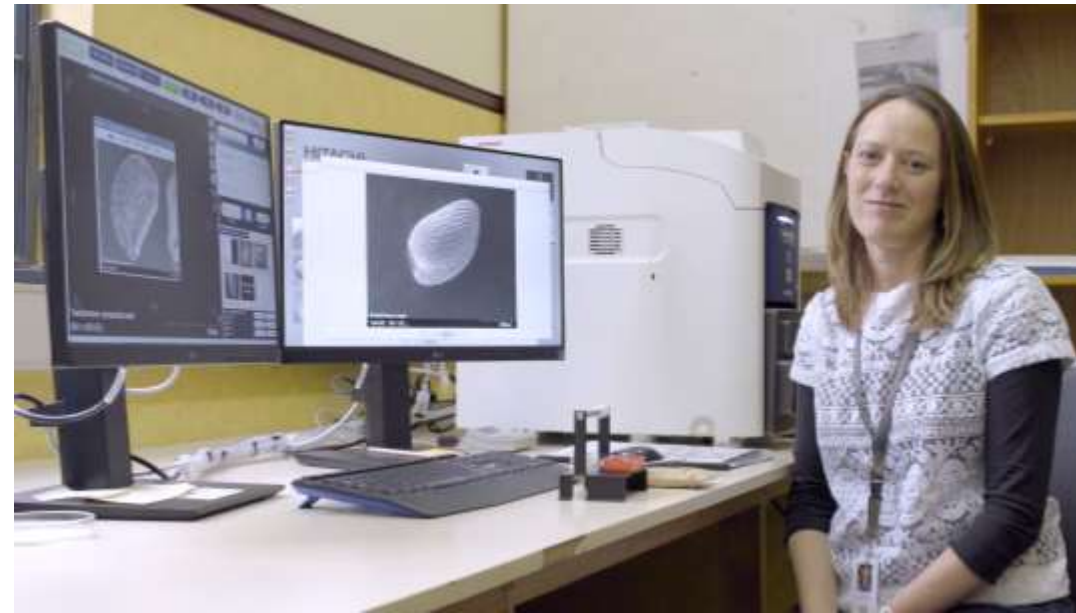


Image: Michael Lawrence-Taylor



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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