



GUIDELINES ⁴

KEEPING RECORDS
ON NATIVE SEED

Revegetation is a long-term undertaking and measuring success is an ongoing task. We need to know the origin and treatment of seed which has contributed to successful revegetation and that which has led to failure. As time passes after planting, initial description and documentation about the seed used becomes increasingly important in understanding the reasons for success or failure. Much of what we know about seeds is the result of meticulous record keeping: from identification of the parent plant and seed collection, through storage, to use in the nursery or field. This is especially true where more than one person is involved at various stages of handling the seeds or where knowledge has been accumulated over time. While scientific techniques for evaluating genetic quality and origin are developing rapidly, good record keeping can tell us a great deal without the use of expensive and complicated equipment.

After looking at record keeping systems across Australia, we developed this guideline to provide recommendations for

keeping records about native seed to a basic standard, whatever your budget or resources. If you have just begun to collect, store or use native plant seed, there is enough practical guidance for you to decide what records you should keep and how best to keep them, whether by hand or computer. If you are a more experienced operator, there is information on a wide range of record categories, records management by computer, a seedbank management software package offer and a free interactive seed holdings database on the Internet.

In Australia we know too little about our native plants; there is great need for sharing information. This guideline offers no encouragement to those who insist on keeping important information about native seed in their heads. We would all much prefer that you find the time to write it down – and here's how.

Why keep records?

Revegetation work is time consuming and labour intensive, and we need to be sure that we are deriving maximum benefit from the work carried out. Experience needs to be passed on and best practices refined to ensure a greater frequency of success. Records of all aspects of the operation from initial seed collection to planting and tending should be kept for future practitioners to learn from and for reference. This guideline deals with the early stages of this chain from seed collection to seed sowing.

The information records of a native seed collection and supply operation are a valuable resource, especially where they involve complete coverage of a local area or region. Commercial seed suppliers and larger community seedbank operators value their records highly and, at the very least, use them in advising customers about such matters as:

- what stock of seed of specific species or provenances is available
- how well a species or provenance is represented by seed collected
- whether certain seed can be obtained through collectors
- which species occur at a location
- which species may be harvested at a certain time
- which lots of seed were collected from locations where environmental conditions match those of particular planting sites
- what the potential performance of the resulting plant may be when used at other planting sites
- how to draw up seed lists for those developing tender specifications for collect and supply contracts.

There are important considerations in seed collection and storage operations that may only be determined when good records are kept. Origin records – such as exact location, collector, timing and resources

required for collection – allow future collections to be made from the same location and to be better planned. Species and stock in hand records are important as operations expand or develop a large throughput of seed.

The quality of seedlots is determined initially by recording the number of parent plants (or the exact plants) sampled at a collection site. This indicates how well the genetic variation is covered. Records of viability and germination tests provide the other main measures of seed quality. Seed processing, handling and storage practices

can affect viability and germination. These effects can be traced if records of the practices applied to each seedlot are kept. A system of quality assurance needs to trace the practices applied to each seedlot to maintain standards and to guarantee viability and ability to germinate.

Records of amounts dispatched, to whom and for what purpose provide an understanding of the client base for the operation and assist with planning. In any seedbank it is critical that one person takes responsibility for ensuring documentation standards are maintained.

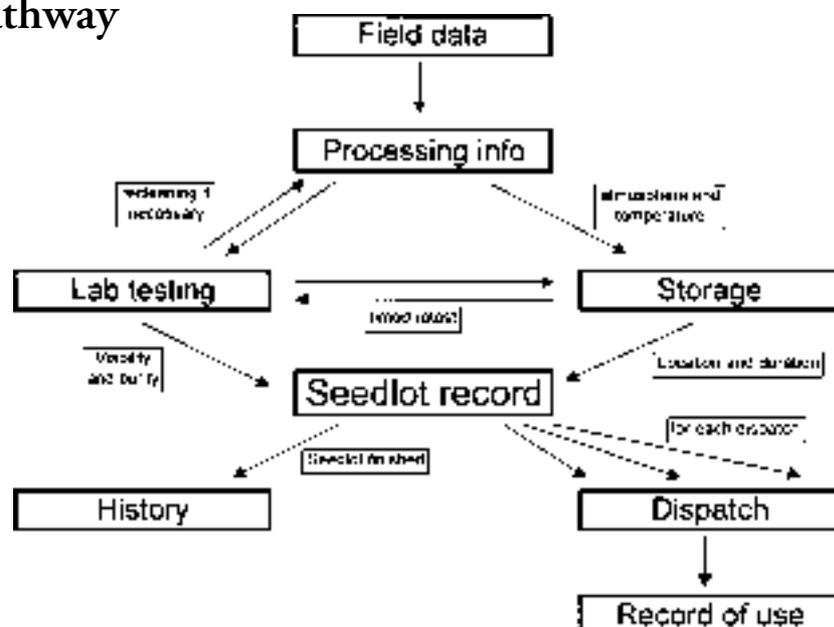
Good record keeping

A good standard of record keeping need not be costly or complicated. It is foremost about ensuring that essential records *are* habitually kept on all seed collected and stored, rather than prescribing *how* they are kept, although this is also important. Good record keeping requires that you develop a system and stick to it. Smaller seed operations can manage quite well with handwritten records. As operations increase in scale, there is a greater need for efficiency and consistency in records management. This is where computers become a viable and justifiable tool.

A good record keeping system is one that:

- is easily accessible and understood by its (often many) users
- is trusted by its users to have accurate and useful information
- provides for quick data entry in the field and back at your storage base
- is easily interrogated by users to extract critical information
- is robust and long lasting
- has a clear set of standards for use and administration of the system that users are required to meet
- has the flexibility to make notes and comments.

Record keeping pathway



A seedlot numbering system

The basic unit of collection and record keeping is the seedlot. A seedlot is a unique batch of seed of one species from one location. Typically, a sequential field collection number prefixed with the collector's initials is allocated in the field by the collector. Collected material is labelled with the collection number to identify it through transport, extraction, drying and cleaning.

Where seed is to be stored, it is good practice to have a unique identification number or code for each seedlot. In a small operation, the field collection number may be used. However where there are many collectors or seedlots, it is safer to register seedlots into a seedbank and allot a separate, unique seedlot number, also

called an accession number. This number allows the passage of a seedlot through a seedbank to be easily traced and acts as a key reference for all records about that seed. This is particularly important where there are many accessions or a number of different seedlots for a single species. A simple registration system should record the date of registration, the field collection number and the categories and criteria described below. A sturdy lined book with columns will suffice and each accession is given a sequential seedlot number; the numbers run down each page starting from 1. Records about storage, viability, dispatch and feedback on seed performance may now be related to seedlot accession numbers or through them to field collection numbers.

Field records

Records of seed collection in the field are the first and the most important of all. For each seedlot, a collection record should be made on a separate data sheet or card, prepared in the field at the time of collection (for an example, see the attached Australian Tree Seed Centre Seed Collection Data Sheet). Many botanic gardens use small hardbound pocket books of field data sheets, which are kept by individual collectors who transfer field records to file copies back at the seedbank. FloraBank makes available for your use a Native Seed Collection Field Data Sheet (see attachment). Copy this data sheet for your use or download it from the *Fact Sheet* page of the FloraBank website (see back page for details).

Register your collection sites

Much of the information recorded in the field is concerned with the attributes of the collection site rather than the seedlot collected. Some seedbanks use a system of registering collection sites and information

about the sites, so that only seedlot details need be recorded in the field by collectors. FloraBank also makes available for your use a Native Seed Collection Field Data Sheet for Registered Sites and a Site Registration Sheet (see attachments).

Field data categories

The information recorded will vary according to needs. As a guide, the following tables list **essential (E)**, **recommended (R)** and **optional (O)** data to record for collections that could be used in three ways: for revegetation, for seed production area establishment or for conservation purposes. For each **category** of data, recommended **criteria** (or what to record) are provided in the table and some notes follow the table.

Categories of field data

Category	Criteria	For revegetation	For seed production	For conservation
Identification	Unique field collection number	E	E	E
Collection date	Day/month/year	E	E	E
Collector ¹	Name, address, collection permit number	E	E	E
Plant name ²	Current genus, species and common names	E	E	E
Collection voucher ³	Was a specimen taken for correct plant identification?	E	E	E
Plants sampled ⁴	Number of plants sampled to make up the seedlot	E	E	E
Population origins ⁵	Are sampled plants of natural, planted or production origins?	E	E	E
Site name ⁶	Name that enables you or others to return to the site	E	E	E
Location name ⁷	Name recognised within the region	E	E	E
Map reference ⁸	Description using latitude and longitude or Australian Mapping Grid co-ordinates	R	E	E
Species frequency	Description as abundant, common, uncommon or rare	R	E	E
Vegetation type	Description using recognised system: varies between states	R	E	E
Vegetation structure ⁹	Description using recognised system: varies between states	R	E	E
Site landform ¹⁰	Description using standard landform types	R	E	R
Site slope and aspect ¹⁰	Degrees of slope and compass bearing of facing slope	R	E	R
Site geology ¹⁰	Description using geology map	R	E	R
Soil texture ¹¹	Description of sand/clay/loam fractions	R	E	R
Soil colour ¹⁰	Description using standard soil colours	R	E	R
Soil acidity ¹²	Measured pH	O	R	O
Amount collected	Amount of either seed or plant material collected by weight volume or number	O	O	O
Seed crop quantity	Description as heavy, medium or light for that species	O	O	O
Seed crop timing	Description as early, peak or late season for that species	O	O	O
Flowers and buds	Presence or absence	O	O	O
Flower and bud timing	Description as early, peak or late season for that species	O	O	O
Predation	Description as avian, insect, etc. and as heavy, medium or light for that species	O	O	O

Notes on field data categories

1. Each collector should use a sequential number prefixed by their (unique) initials to record information about seed, voucher specimens and plant materials. The credentials of various collectors, their accuracy in identifying plants and their competence in collection are important. It may also be important to record the number of collectors (for example, volunteers) who collected a seedlot against the supervising collector's initials for later reference on consistency and quality.
2. Each collector should use the current scientific name (genus, species and subspecies), as common names are ambiguous.
3. A specimen should be taken of leaves, flowers, fruit or other parts of any plant collected for the first time or when the collector is unsure of the identity. The specimen may be later identified at a herbarium, by using reference material or equipment at home or by someone with the necessary botanical knowledge.
4. The number of plants sampled indicates the genetic diversity of the seedlot. For revegetation purposes, the number of plants sampled should be recorded but may be a best guess. Sometimes seed from each individual plant may be kept separately (for example, for research purposes or to ensure correct identification or as part of a conservation collection) and additional records may be taken to assist in identifying the parent plants or to show their relationship with other vegetation.
5. If the population has been planted, you may wish to establish who did the planting and the origins of the seed or seedlings used.
6. The site name should convey sufficient information to enable a person to return to that site. Geographical features such as mountains, rivers, distances along roads or rivers, or specific locations within a forest are used to give location details. Recording the location of individual plants is not normally required. A geographical positioning system (GPS) reading is recommended.
7. Location name should refer to the general collection locality. Using gazetted place names and map names helps avoid ambiguity and confusion. Collection location and provenance descriptions are usually based on this level of information.
8. If the site is geocoded using latitude and longitude or Australian Mapping Grid references, then many of the site attributes are accessible from government geographical information systems and a range of other information may also be found, stored according to grid reference.
9. Vegetation structure should use a standard classification, for example, from 'tall closed forest' to 'low open shrubland'. A more descriptive approach is provided in the *Australian Soil and Land Survey Field Handbook* (McDonald *et al.* 1998). This is a very detailed, standardised approach to field data capture. Much of its contents can be simplified to suit the user.
10. Standard naming systems, such as those provided in the *Australian Soil and Land Survey Field Handbook*, should again be used for site landform, slope, geology and soil colour. Land system approaches are also good sources of environmental information as they assess the landscape based on a composite of soil, vegetation, landform and climate types. These approaches are described in the *Australian Soil and Land Survey Handbook: Guidelines for conducting surveys* (Gunn *et al.* 1998).
11. Field texture determination should use moist bolus (a small handful of soil moistened and kneaded into a ball). See McDonald *et al.* 1998.
12. Soil acidity may be quickly tested in the field using a representative soil sample from a depth of about 150 millimetres. Avoid testing near roads or where soil is disturbed, as these areas may have a non-representative pH. See McDonald *et al.* 1998.

Seed processing and storage records

Records of processing and storage methods are very important for proper stock management, to maintain standards and to understand changes in native seed quality (especially viability) in storage. Indeed, it is difficult to improve poor processing or storage practices in a seedbank if such records are not kept. A record system reminds and informs operators of the requirements for successful storage of a species. A record system serves as a checklist to ensure that required seed treatments and storage practices are carried out. It contributes to a system of quality assurance.

Storage and processing data categories

FloraBank makes available for your use a Native Seed Storage and Dispatch Data Sheet (see attachment). Copy this data sheet for your use or download it from the *Fact Sheet* page of the FloraBank website (see back page for details).

Again, the information recorded will vary according to needs and, as a guide, the following tables list **essential (E)**, **recommended (R)** and **optional (O)** data to record for the three broad collection objectives.

Categories of processing and storage data

Category	Criteria	For revegetation	For seed production	For conservation
Identification ¹	Unique sequential accession number allotted to each seedlot	E	E	E
Accession date ²	Day/month/year	E	E	E
Seed weight in stock ³	Actual weight in grams (or kilograms if appropriate) of the seedlot on accession	E	E	E
Container ⁴	Type of storage container used	R	R	R
Storage location ⁵	Storage temperature regime and exact location in seedbank	R	R	R
Seed quality ⁶	Assessment as very good, good, average, poor or very poor	R	R	R
Seeds per gram count ⁷	Code for count method used	O	O	O
Seeds per 100 grams ⁷	Count of seeds per 100 grams	R	R	R
Drying ⁸	Code for the method used and notes of irregularities	R	R	R
Extraction ⁸	Code for the method used and notes of irregularities	O	O	O
Cleaning ⁸	Code for the method used and notes of irregularities	O	O	O
Pest control ⁸	Code for the method used and notes of irregularities	E	E	E
Germination test ⁹	Type of test used and who conducted it	R	E	E
Germination test result ⁹	Results of test expressed as number of germinants per 100 grams of seed	R	E	E
Seed moisture test	Type of test used and who conducted it	O	R	E
Seed moisture content	Results of test expressed as % moisture content	O	R	E

Notes on processing and storage data categories

1. The accession number should uniquely identify the seedbank and seedlot.
2. The date is used to determine the age of the seedlot in the seedbank and the time from collection to accession.
3. The base weight of a seedlot in storage at accession is used to determine seed in stock and calculate remaining seed stocks after dispatch.
4. The storage containers used may be related to future decline in viability, predation by pests or other seed performance variables.
5. This category identifies the temperature regime under which seed is stored and to which it should be returned, and acts as a location guide so that seedlots are not lost.
6. Seedlot quality is a broad rating determined (somewhat subjectively) by the seedbank on accession and should include cleanliness, whether the seed still has vegetative structures attached (native grasses), damage from predation and so on. Rating assists in management, pricing or disposal of seedlots. It is important for maintaining quality in the standard of the product delivered to customers and in the customers' understanding and expectations of a seedlot.
7. Increasingly, the number of seeds rather than the weight of seed is used to determine quantities needed by seed users. For many species, seed numbers per 100 grams may be established for one seedlot and then used for all seedlots of that species collected. However, some species do exhibit marked seed size differences between provenances. It is best to record the method of counting as well as the actual count of seeds.
8. Treatments used in processing seeds may be related to future decline in viability, predation by pest or other seed performance variables. Codes used should specify broad treatment types (for example, for drying: air-dried, igloo, greenhouse, oven and so on). Pest control using chemicals should always be recorded to alert users to precautions that may need to be taken for safely handling the seed.
9. There are many ways of determining the viability and ability to germinate of seeds. Whatever methods are used, records should be kept on the approach and results. These records are a basis for negotiation with customers and seed users about the seedlots concerned. They can prove to the purchaser the seed's ability to germinate and may form the basis for seed prices or part of the conditions for payment.

Seed testing

Germination results can be recorded on the field collection data form or the storage and dispatch data form (see the FloraBank Native Seed Storage and Dispatch Data Sheet). Often a separate record sheet is used to record methods and results of both germination and seed moisture content tests (for an example, see the attached Australian Tree Seed Centre Germination Test Sheet).

Seed stock and dispatch

Seed centres need to keep up-to-date records of seed in stock, dispatches and the purpose or destination of seed dispatched. It is important to record where particular seedlots end up and how they are used, especially as revegetation areas age and are used in turn for seed collection.

There are a number of methods of recording this information based on the seedlot accession number. Again, a simple card system with a card for each seedlot or a hardbound book using a new page for each seedlot may be used. Alternatively, programs

such as Microsoft Excel or Claris FileMaker may be used on a computer. Each time seed is sent out, a record of the date, who it was sent to, the amount sent and the purpose is made and the balance on hand calculated.

FloraBank recommends the dispatch label include:

- seedlot (accession) number
- genus and species name in full
- origin of seedlot (location name only, not collection site name)

- number of plants sampled in collecting the seedlot
- quantity of seed dispatched
- germination and pre-treatment methods recommended for the seed (if available).

There are regulations in most states governing the sale of goods including seed. These specify labelling requirements for the name and the weight of the seed; there are often penalties for inadequate or misleading labelling. It is also wise to place a warning on the label regarding any potentially allergenic or hazardous substances used in seed processing or pest control.

Computer-based systems

FloraBank recommends that you start with a simple and efficient handwritten system unless you know you have greater needs. Such a system is not only more likely to be used but more likely to be understood by users.

The costs and benefits of handwritten systems versus computer-based systems are relative to the scale of seed operations. For many small operations, a simple and efficient handwritten system, operated at almost negligible cost, will usually be more appropriate and effective than more complex or computer-based systems. For example, handwritten records may be kept on card files, on field collection sheets, in seedbank stock and dispatch books, or on labels or stickers attached to seedlots in storage. Indeed, most seedbanks start out this way. As they grow in size and complexity, and better understand their records management requirements, some successively upgrade to more complex systems.

Computer-based systems are generally justified where your seed operation holds more than 500 seedlots or handles upwards of 1000 seed transactions (acquisition or dispatch) each year. The amount of seed held is also important for, if all seedlots are small (for example, in many nurseries), the costs of a computer system may be out of scale to the value of the seed holdings themselves.

The decision to use a computer-based record system introduces costs in hardware and software, time and training of personnel, and maintenance. There are degrees of complexity, from the use of standard spreadsheet programs (for example, Microsoft Excel) to handle essential collection and stock control records to the use of small business packages (for example, Quicken and MYOB) to handle invoice and dispatch. A small number of larger seedbanks use more complete records management systems – such as the Seed Supply System developed by Greening Australia (see below) – which cover collection, receipt, storage, dispatch, invoicing and report generation.

A computer-based system should use the categories set out above as ‘fields’ in spreadsheets and databases. There are standard exchange formats for data stored in some of these fields.

Australian place names are standardised through the gazetteer (www.environment.gov.au/database/MANZOOR.html) and allotted latitude and longitude as well as Australian Mapping Grid co-ordinates.

Genus and species names are available nationally through the Australian Plant Name Index at the Australian National Botanic Gardens website (www.anbg.gov.au/names.html) and in some cases from state botanic gardens.

Seed Supply System

FloraBank has made available a management system (customised from Microsoft Access software) suitable for medium to large seedbanks. The system was developed by Greening Australia, with the assistance of the Alcoa Revegetation Assistance Program, initially for use in Victoria. The system originally operated on the full Victorian FIS species list. Subsequently, the system was modified for use throughout Australia and species lists for each state were included. It uses the categories outlined above and requires Microsoft Access for Windows 97 or later.

Features of the system include:

- the ability to be used at an entry level (for essential functions) or an advanced level
- a complete database structure for details of seed collectors and clients
- collection site description, location and grid referencing
- seed treatment and storage records
- a seed in store inventory related to costing, distribution and invoice functions
- the ability to generate reports for localities, provenances, activities of collectors, uses of seed and licence requirements such as FIS species locations.

If you would like more information about Seed Supply System or wish to arrange for a trial copy of the software, contact the FloraBank Coordinator (details on back page) or
Greening Australia Victoria
Phone: 03 9457 3024,
email: general@gavic.org.au,
post: PO Box 525, Heidelberg VIC 3084.

FloraBank website, Directory and Catalogue

Each month there are over 13,000 visits to the FloraBank website looking for information and assistance, or because they are simply interested in native seed. The majority of people dealing with native seed (up to 80%) have access to a computer and about half of these people have access to the Internet; and the number is increasing.

We urge those with access – whether from a government, commercial or community background – to use the Internet to find and exchange information about native seed. FloraBank has established a website that anyone may use free of charge to tell others about their work, services, products and seed holdings.

Use the *Forum* pages to post questions, problems or solutions from your work that some of our many visitors may be able to answer or use. Swap information on how to collect, store and propagate seed. Post news and event information.

The site includes a national *Directory* where seedbanks, collectors and suppliers can leave contact details and search for those of others. Once registered on the *Directory*, seedbanks and suppliers can place basic details of their seed holdings on the *Catalogue* (a database).

References

Gunn, RH, Beatie, RE, Reid, RE and van de Graaff, RHM. 1988. *Australian Soil and Land Survey Handbook: Guidelines for conducting surveys*. Inkata Press, Melbourne.

McDonald, RC, Isbell, RF, Speight, JG, Walker, J and Hopkins, MS. 1998. *Australian Soil and Land Survey Field Handbook*. 2nd edn reprint. CSIRO, Canberra.

Attachment 2

Native Seed Collection
Field Data Sheet

Registered site

Collection number:

Genus:		Date collected: day month year	
Species:		Registered site code:	
Site name:		Latitude:° ' " South	
Location name:		Longitude:° ' " East	
GPS or other map and grid ref:			
Seed lot description:			
Abundance: <i>please circle</i> <i>Dominant: Abundant Occasional Rare Solitary</i>		Number of plants collected from:	
Origin of parent plants: <i>please circle</i> <i>Wild population Planted Unknown</i>		Voucher taken? <i>please circle</i> YES NO	
Plant form: <i>sedge, grass, tree, shrub, etc</i>		Photo taken? <i>please circle</i> YES NO	
Seed crop quantity: <i>please circle</i> Heavy Medium Light		Seed crop timing: <i>please circle</i> Early Peak Late	
Collector name:		Signature:	

Notes: Description of vouchered plants, other collectors, site sketch.

Attachment 3

Site Registration Sheet

Site number:

Site name:		Date registered: day month year	
Location name:		Latitude:° ' " South	
Other map and grid ref or GPS co-ordinates:		Longitude:° ' " East	
Habitat type:		Altitude: metres	
Aspect: <i>please circle</i> N NE E SE S SW W NW		Position on slope: <i>please circle</i> <i>Watercourse Flat Lower slope Upper slope Crest Dune</i>	
Geology:		Soil pH:	
Surface soil description: Colour: Type:		<i>Please circle: SAND CLAY LOAM</i>	
Vegetation community, association, type:		Weed invasion: <i>please circle</i> High Medium Low	
Dominant upper storey species:		Species diversity: <i>please circle</i> High Medium Low	
Dominant middle storey species:		Species diversity: <i>please circle</i> High Medium Low	
Dominant lower storey/groundcover species:		Species diversity: <i>please circle</i> High Medium Low	
Name of collector or person registering site:		Signature:	

Notes: site sketch on reverse

Attachment 4

Native Seed Storage
and Dispatch Data Sheet

Accession number: _____

Genus _____		Latitude: _____	
Species _____		Longitude: _____	
Location name: _____		Altitude (metres): _____	
Habitat: _____		Position on slope: _____	
Mean annual rainfall (mm): _____		Mean annual days of frost: _____	
Average daily maximum temperature _____		Nearest met station: _____	
Average daily minimum temperature: _____		Plant form: _____	

Collection summary:

Seed/lor owners: _____			
Collector: _____		Collection date: _____	
Abundance: _____		Number of plants collected from: _____	
Aspect: _____	Weed invasions: _____	Origin of parent plants: _____	
Vegetation community, association: _____			Soil pH: _____
Geology: _____		Soil description: _____	

Storage summary:

Seeds per 100g: _____		Viable seeds per 100g: _____	
Storage container: _____		Seed quality: _____	
Storage location: _____		Pest control: _____	

Germination test:

Date	Test	Germinants per 100g	Tested by
_____	_____	_____	_____
_____	_____	_____	_____
_____	_____	_____	_____

Dispatch:

Date	Seed out (kilograms)	Consignee	Project/use code	In stock (kilograms)
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____



AUSTRALIAN TREE SEED CENTRE
CSIRO Forestry and Forest Products
PO Box E4008, Kingston, ACT 2604

PROVENANCE DATA

Species:	Date: / /	Seedlot: 1
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Location:

State:	Lat: °	Long: °	Alt: 0m	Koeppen Climate Class:
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Provenance:	Map:
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Habitat:

Population Data	Soil Data
Veg'n Structure:	Slope: °
Sp. Frequency:	Geology:
Root Sucker:	Soil Texture:
Coppice:	Soil Colour:
Aspect:	PH:

Phenology	
Seed Crop:	Crop Timing:
Predation:	Bud Timing:
Bud Crop:	Flower Timing:
Flower Crop:	

Association Includes	Frequency	Ht. (m)

Collection Notes

Collection No.	Bot. sp	Ht. (m)	Age	Bole		Crown				Seed Wt. (g)	Viability. (10g)
				dbh (cm)	Form	Den	Brn	Wdt	Ht (%)		
Team:			Bulk/Individual: /				Total/Average				

Your Comment

The FloraBank guidelines are a consolidation of existing information and draw on the practices observed at seedbanks across Australia as well as the expertise and technical understanding of the Australian Tree Seed Centre at CSIRO Forestry and Forest Products, Greening Australia's Seedbanks and the Australian National Botanic Gardens Seedbank. The guidelines present, as far as is known by the authors, best practices. However, they are drafts because we recognise that other people may have better approaches, and that best practices change with time. Also, our climate and vegetation is diverse and not all practices are equally applicable across Australia. If you would like to comment on any of the guidelines please contact the FloraBank Coordinator. If you have practices or knowledge you would like to share with others you can do this through the forum pages of the FloraBank website.

Written by Warren Mortlock and the Australian Tree Seed Centre

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