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Seed Notes for Western Australia

No. 2 Seed collection

IN THIS ISSUE

This issue of **Seed Notes** provides some background information on important aspects of seed collection.

It covers:

- Legal aspects of seed collection
- Appropriate strategies for collecting seed
- Local provenance
- Voucher specimens
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- Handy hints for seed collection
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Department of
Environment and
Conservation

Our environment, our future

Seed collection

As the demand for seed from native species increases it is important that standard procedures are followed. Problems caused by collectors can alienate landowners and land managers, making it more difficult to gain future access to collecting areas, and can deplete plants in a wild population. It is important to know why you need to collect seed in the first place. Then decide what species to collect, where you can collect it, when it will be mature for collection and how much of it is necessary for your needs.



A range of equipment used for seed collection.

Photo – Anne Cochrane

Legal aspects of seed collection. Are you licensed?

In Western Australia, a licence for scientific or other prescribed purposes is required for non-commercial harvesting of flora on Crown lands (this includes seed collection activities). All persons collecting on Crown land must be licensed, but a single licence may be held by a community leader, and will cover a group of people. All members of the group need to be listed and the group leader is responsible

for all pickers. The licence is obtainable from DEC. If you wish to access reserves and remnant vegetation vested in government authorities

or agencies (for example DEC, the Department of Water, the Public Transport Authority, Water Corporation and Western Power) you must obtain permission from them. Permission to collect seed from private property for non-commercial activities is required from the landholder and a licence for collecting on private property is only needed if the seed is to be used for commercial gain.



Collecting seed from *Verticordia* species.

Photo – Anne Cochrane

Collecting strategies

Collect seed widely from many plants of your target species throughout the area where the population grows (from at least 50 plants). In this way you are likely to capture a fair proportion of the genetic diversity of that species. Also make sure your collection represents the genetic variation of the species by collecting from a range of different plant types (large and small plants, big and small flowered and different flower colour and shades). Seed collection

should never deplete the population of a potential contribution of seed from any individual plant sampled. This will allow natural regeneration to occur in the population or provide material for the soil seedbank. Never take more than 20 per cent of the seed from a particular plant unless that plant and the immediate habitat where it grows in is destined for destruction (for example, clearing or road maintenance).



Why use local seed?

It makes sense to use seed in an area where it originally came from because local populations have evolved and adapted to local conditions. Local populations are more likely to be the most suitable for site rehabilitation and land management,



especially in terms of long-term survival and ecological processes. There may be genetic variation between populations that may reflect critical reproductive and physiological differences that are not evident at the taxonomic level. The exact

definition of a population and what is local in the field is far from simple, although for rare plants it is likely that they occur in small and disjunct groups or as isolated occurrences. It is important to note that within a population there may be ecotypic, or micro-environmental variations, that require sampling.



Two subspecies of *Lambertia orbifolia*—morphologically similar but genetically distinct. Photo top – Andrew Brown Photo above – Kate Brown

Voucher specimens

Vouchering of botanical specimens for lodging with a herbarium is very important.

A specimen that represents the mean of the species is required. Do not collect a specimen from a plant that doesn't look like every other plant. Multiple vouchers may be necessary if plants within the population vary. It is essential that specimens be accurately identified to species level. Voucher material from the population where you are collecting should be retained to ensure verification of the species and for reassessment in the event of taxonomic reviews.



Herbarium specimen. Photo – Anne Kelly

GLOSSARY OF TERMINOLOGY

This glossary provides a list of some of the more frequently used words in the Seed Notes series.

Achene

Small dry indehiscent fruit with a single seed (e.g. fruit of *Adenanthos*).

Annual

A plant that completes its life cycle within a single vegetative period or year.

Biological diversity

The biological richness of a community or area.

Cotyledon

A primary leaf of the embryo; a seed leaf.

Dehiscence

The opening at maturity of fruits or flowers to release seed or pollen.

Dispersal

The outward spreading of propagules (in particular seed) from the point of origin or release.

Dormancy

A temporary suppression of growth that may be an advantage for survival in unfavourable conditions. Dormancy may be seasonal (e.g. dormant buds in deciduous trees); due to the presence or absence of growth factors in the seed (e.g. light, water, hormones); or due to the presence of a seed coat that is impermeable to water and gas exchange and restricts root growth. Dormancy can be overcome artificially in many ways and may mimic natural processes.

Drupe

Fleshy indehiscent fruit with a hard woody covering surrounding single or multiple seeds (e.g. *Eremophila*, *Astrolooma*)

Ecotype

A group of plants essentially of the same genetic constitution with members differing in appearance and reproductive vigour due to differences in their varying environments.

Eliaosome (or aril)

A fleshy outgrowth from the seed which is often bird or ant attracting.

Embryo

A dormant plant within the seed; unborn offspring. The embryo is very small and composed typically of an axis with one or more lateral cotyledons, a terminal bud and a root tip or radicle.

Endemic

Species or other taxonomic group restricted to a particular region, owing to factors such as isolation or response to soil or climatic conditions.

Endosperm

Multicellular food storing tissue formed inside the seed of a flowering plant after fertilisation. The food is mainly starches and oils providing nutrient for the developing embryo.

Ex situ conservation

Conservation of material (plant or animal) away from its native habitat (e.g. in botanic gardens, genebanks, zoos).

Follicle

Dry dehiscent fruit opening along one side (e.g. *Dryandra*, *Grevillea*).

Fruit

A structure that develops from the ovary of a flower after fertilisation. It may or may not have an accessory structure and can be single or collective, fleshy or dry, dehiscent or indehiscent.

Genebank

Long-term storage facility for the conservation of genetic material (germplasm). This material can be in the form of seed, pollen or plant tissue or can be a field genebank of living plants.

Genetic variability

Variation in the genetic composition between individuals, species or populations of species.

Germination

Growth of the embryo to form a seedling plant. It begins with water uptake by the seed (imbibition) and ends with the start of elongation by the embryonic axis, usually the radicle (root tip).

Germplasm

Plant material that has reproductive capacity. This includes seed, cuttings and tissue culture material.

Indehiscent

Fruits that do not split open to release seed.

Inflorescence

A flowering shoot of more than one flower.

In situ conservation

Conservation of material (plant or animal) in its native habitat.

Legume

Dry dehiscent fruit usually opening along two lines (e.g. pea family)

Locule

The chamber of the fruit that contains the seed. There may be multiple locules in a fruit.

Perennial

Plants that persist for more than one year.

Predator

Living organisms that attack and destroy other living organisms.

Propagule

Any part of an organism produced by sexual or asexual reproduction that is capable of giving rise to a new individual (e.g. cuttings, seed, bulbs).

Radicle

The part of the plant embryo that will develop into a primary root.

Re-introduction

An attempt to establish a population of a particular species in a site where it was known to occur formerly, but where it is now extinct.

Resprouter

Plants that have the ability to regenerate vegetatively after fire and can form clones by root suckering, fragmentation of root stocks or rhizomes, or produce corms, tubers or bulbs.

Scarify

To make a slight incision or scratch the surface of something (e.g. nicking or filing a seed coat to expose the seed to stimulate germination).

Seed

A ripened ovule which develops after fertilisation. It contains the embryo and stored food (endosperm) protected by a seed coat or testa. Generally contained within a fruit.

Seeder

Obligate seeders are those plants that have their growth cycle terminated prematurely by fire, and rely on regeneration from seed.

Taxon/taxa

The classification unit to which individuals are assigned (e.g. family, genus, species, subspecies).

Translocation

Deliberate transfer of plants or regenerative plant material from one place to another, including existing or new sites or those where the taxon is extinct (includes re-introduction).

Viable/Uiability

Having the capacity to live, grow, germinate or develop (relative measure of survival).

Hints for seed collection

- ☉ Decide what you want to collect, where and when to collect it and how much of it to collect.
- ☉ Obtain necessary permits and permission.
- ☉ Examine the bounds of the population. Is there a mixture of species? Keep bags of seed of different species separate.
- ☉ Examine fruits and seed. Is there insect damage or empty seeds and is the material ready to collect?
- ☉ Collect seed randomly and equally from a range of individual plants.
- ☉ Collect ripe or mature fruit/seed only.
- ☉ Collect sufficient seed for your project but do not over collect (no more than 20 per cent of seed available).
- ☉ Collect herbarium specimen(s).
- ☉ Collect in dry weather if possible, otherwise seed may go mouldy if not dried quickly. Also be aware of hygiene requirements particularly in dieback risk areas (don't be responsible for spreading disease).
- ☉ Collect only seed or fruit. Avoid collecting other plant material as the risks of insect infestation and fungal growth are increased.
- ☉ Use breathable containers such as paper bags or cloth calico bags.
- ☉ Label containers and do not damage seed. Accurate record keeping is very important. Write down who collected the seed, where it was collected, when it was collected and how many plants it was collected from. Any other information about the plants you are collecting from (e.g. health status, threats and flowering) may be worth noting for future reference.



Collecting Acacia seed.

Photo – Tony Friend



Collecting seed of Goodenia in the Ravensthorpe Range.

Photo – Anne Cochrane



Collecting seeds of the threatened epacrid *Sphenotoma drummondii* in the Stirling Ranges.

Photo – Ellen Hickman



Storage of seeds

Once collected, it is important to provide optimum storage conditions if the material is not to be used immediately. These optimum conditions mean seed should be dried (not in an oven but air dried or using a desiccator) and kept cool (in a fridge provided the seed is sealed tight after drying, although freezing of seed will guarantee greater longevity). Seed kept under sub-optimal storage conditions can lose viability very quickly and may not germinate when required. For many species there will be years when seed set fails, and other years when seed yields are above average. Improving the potential for seed storage means that collections of material can be made several years before they are required in rehabilitation or revegetation programs, maximising the occurrence of heavy yields in response to favourable environmental conditions.



Collecting seed of endangered swampland plants for long term storage.
Photo – Andrew Crawford



Wagin banksia (*Banksia oligantha*) has an endangered status.
Photo – Babs and Bert Wells/DEC

The demand for seed material is unlikely to abate, with future increases predicted. Seed storage by conventional means (low moisture and low temperature) offers a cheap and effective method of preserving a broad range of genetic material for short-term rehabilitation and revegetation needs. It also goes a long way to meeting the long-term challenge of *ex situ* conservation of endangered flora in Western Australia.



Recommended reading

DEC, the Botanic Gardens and Parks Authority and the Department of Agriculture and Food can provide additional information on basic collection, testing and storage of seed, and there are many published books giving advice. Some recommended sources of information include:

The Sustainable Seed Bank Project facilitated by Greening Australia, Western Australia (providing more detailed information on seed collecting, seed storage and seed orcharding). 10–12 The Terrace, Fremantle, WA 6160.

FloraBank guidelines found at www.florabank.org.au or through the FloraBank Coordinator, P.O. Box 74, Yarralumla, ACT 2600.

Langkamp, P. 1987. *Germination of Australian Native Plants*. Inkata Press, Melbourne.

Murray Ralph books on *Germination of Local Native Plant Seed* (1994), *Growing Australian Native Plant Seed* (1993) and *Seed Collection of Australian Native Plants* (1997) providing additional information on particular species of interest for

revegetation, tree planting and direct seeding.

How to Create a Local Herbarium, written and illustrated by S. Patrick. Land for Wildlife and CALM 1997.

Harris, J. G. and Harris, M. W. 1994. *Plant Identification Terminology. An illustrated glossary*. Spring Lake Publishing, Utah.



Seed Notes for Western Australia



These **Seed Notes** aim to provide information on seed identification, collection, biology and germination for a wide range of seed types for Western Australian native species.

THREATENED FLORA



SEED CENTRE

They have been written and compiled by Anne Cochrane, Manager of DEC's Threatened Flora Seed Centre.

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