Chapter 10
Seed Collection and Propagation of Local Native Plants

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Seed collecting

Anyone can collect seed. It is a great way to learn hands-on about plants in your area. We all usually start by collecting strange looking plant material until one day you discover that you have not collected seed, but rather a gall or deformed seed pod! The best way to start is have a close up inspection of a plant and soon you will become a proficient collector. It's simple, easy, very rewarding and completely addictive.

Why collect local seed?

- The easiest way to grow most plant species is from seed.
- The best plants to grow for revegetation are those that are local to your area.
- The best way to maximise and maintain genetic diversity is to propagate from seed.
- The most time, money, material and infrastructure efficient way of growing plants is from seed.
- The best way to ensure you get the plants you want is to collect your own seed.

Where to collect seed and permits for seed collection

Table 1: Suggested seed collection sites and who to get permission from.

Location	Permission Required From
Private property	Landholder
Roadsides	Local council
State Forest	State Forest NSW
Crown Land	DLWC or managing authority eg. council, lease holders
Stock Reserves	Rural Land Protection Board
Nature Reserve/ National Park and/or Threatened Species from any of the above (NB, special permit required)	NSW National Parks & Wildlife Service

What, when and how to collect seed

To successfully collect seed you need to be able to recognise mature fruit. Seed is nearly always enclosed in some sort of fruit (think of apples, peas and nuts). In most cases when collecting "seed", you are collecting fruit from which seed is later extracted. Remember, a plant needs to flower, grow fruit and have the fruit mature before the seed is mature and ready for collecting.

To know when a seed or fruit is mature requires regular observation. By doing this you will become familiar with any subtle changes in the fruit development and maturity. When you think the seed is ready to collect try the 'paper bag test'. Collect a small amount of fruit, place it in a paper bag or old envelope and leave in a sunny position for a couple of days. If

the fruits 'release' their seed they are likely to be mature.

Some important points to consider

There are national guidelines for seed collecting. These have been developed by Florabank to ensure native seed collection practices are done in a responsible and ethical manner and to provide a consistent approach to seed processing, storage and management. The Florabank Guidelines list a number of key principals that are summarised below (see references for guidelines).

1. Only take 10 percent of the overall fruit crop of each plant. This will maximise the chances for natural regeneration of that plant population and minimise the loss of an important food source for native fauna.
2. To maximise genetic diversity of the seed collected always collect from a minimum of 10 plants spaced widely apart and avoid collecting from isolated individuals.
3. Minimise damage to plants, hand strip seed or use sharp secateurs.
4. Never fell plants just for seed collecting. However, take advantage of storm damage to collect seed from larger trees.

Preparation and equipment for seed collecting

It is worthwhile preparing some valuable information before collecting seed.

1. Identify and list the species you wish to collect.
2. Research when these plants are likely to have seed ready for collecting and develop a timetable for collection.
3. Identify where there is likely to be healthy populations of the species you want to collect (always avoid collecting from single specimens). Map these plant locations.
4. Make sure you have obtained permission to collect.

Most of the equipment you will need for collecting small amounts of seed will be at home. These include buckets, paper bags (envelopes), secateurs, long-handled pruners, wool packs, gloves, pen and paper.

Collection guide

A general collection guide for the main plant species likely to be used for revegetation is found in Table 2.

Cleaning seed

The main reason for "cleaning" seed is to separate the seed(s) from the fruit. Ensure the seed has been dried well. This is best achieved by laying seed out on sheets in a warm and predator proof area. This makes extraction much easier.

For cleaning seed you can start with a soil sieve from the hardware shop, a fan and any other sieve-like piece of equipment. Even blowing with your mouth over the top of seed can remove dust and unwanted seed pods (ie. winnowing). It is important to remove as much non-seed material as possible before storage and sowing.

Storing seed

It is critical to store seed correctly. To do all the hard work of collecting and cleaning and then to have the seed devoured by insects or lose it's viability is devastating. Clean seed from fruit as quickly as you can manage then take the following steps.

- Hard-coated seeds such as wattle, peas and hopbushes can be cleaned in COOL water. Anything that floats can be discarded, as this seed is usually not viable. Dry the seed well.
- Place seed into airtight containers (old jars with lids that seal very well).
- Label jars well (species, date collected, where collected).

- Place containers in freezer for a couple of hours.
- Remove containers and let seed return to room temp and check that seed is still dry.
- Store seed in a dark cupboard that is as insect and mouse proof as possible.

You can also treat seed with insecticides or carbon dioxide. When using either of these treatments, avoid handling the seed too much and adopt appropriate safety procedures.

Regularly check stored seed as insects have an incredible ability to get into tight jars!

Table 2: General collection guide for the main plant species likely to be used for revegetation.

Plant Type	Species Examples	Method	General Timing
Tall trees	Eucalypts, bulloak/ sheoak, native willow, pines	Cut off smaller branches with large quantities of fruit using extension pruners. Remove as much fruit as possible from branches on the site.	*Eucalypts can hold their seed for a long time. Collect from February to September. *Bulloak/ sheoaks hold seed for a short time. Best collect early January. *Native willow late December. *Pines best collect just before fruit opens in late December.
Larger shrubs	Bursaria, golden wattle, western black wattle	Most seed can be hand stripped from bushes into buckets or bags. Bursaria - use secateurs to remove branch tips that hold fruits.	*Most wattles are ready to collect from late November to January (species vary). *Bursaria collect late January. Fruits can be collected once the seed inside is brown even if fruits are green.
Smaller shrubs	Punty bush, peas, hop bushes	Hand strip seed from bush into buckets or bags. Some peas can be collected using vacuums (make sure the vacuum does not draw seed through mulching blades).	Seed of these species usually ripen suddenly and drop within a couple of days. Be vigilant with monitoring to catch seed from mid November to late December.
Grasses	White-top, kangaroo grass	Test ripeness by pulling seed heads through hand. When individual seeds come away grass it is ready to harvest. Collect by either hand stripping (very slow), vacuuming, stripping, whipper snipping, slashing.	Different species have very different times for ripening, see individual species descriptions in the Guide.
Lilies	Chocolate lily, vanilla lily, milkmaids and wilcannia lily	Snip off the seed heads. Mature seeds can be heard rattling in the seedpods.	Seed usually ready late November to January
Daisies	Everlastings, burr daisies, olearia	Seeds vary from fluffy seed to burr. Collecting best done by hand. With fluffy seed, it is important to make sure you have seed and not just fluff.	Late November to January
Fleshy seed	Flax lily,	Collect individual fruits by hand.	Late November to January

Table 3: Seed cleaning methods for different types of fruits.

Type of Fruit	Example Species	Cleaning Method	Storage Conditions
Capsules	Eucalypts, melaleucas, callistemons	Lay fruits and any branch material out on sheets to dry. Capsules open very quickly. Shake branches over sheet then separate seed from other fallen material by sieving.	Store in air tight containers at low humidity and temperature.
Grains	Grasses, sedges, daisies	Strip seed and husks by hand then sieve. Some grasses are hard to clean such as Kangaroo Grass.	Store in airtight containers at low humidity and temperature.
Cone	Pines, Bulloak, hakea, banksia.	Remove cones from branches. Lay out to dry for a couple of weeks. Shake cones in a sieve and the papery seeds should release easily.	Store in fridge to maintain seed viability.
Pods	Wattles, peas, senna, hop bush	To release seed from their attachment to the pod, bash or crush seed within a bag or roll a rolling pin over smaller pea species to break up pods. Sieve to separate pod material from seed.	Store in airtight containers at low humidity and temperature.
Light fluffy seed	Daisies, dogwood	Separate seed and "fluff" in a covered sieve or use a vacuum with suction control.	Store in airtight containers at low humidity and temperature.
Fleshy seeds	Dianella, rhagodia, quandong, eremophila	Soak fruits in water, then rub over a chunky sieve to break up flesh. Dry out flesh and seeds then rub over a sieve again to remove dried fruit particles.	Store in airtight containers at low humidity and temperature.

Note: Avoid leaving any pod material with seed as this can often harbour seed eating insects and their larvae.

Record keeping

Keep a record of seed you have collected and how it was used. The "Florabank Guidelines" are worth looking at for those more dedicated at record keeping and those aiming to work at a larger and more serious scale. The base information that is important to record is:

- plant name. If unsure, collect a plant specimen that has leaves, fruits and if possible flowers;
- location - where the seed was collected (include enough detail for you to find this site again);
- date collected;
- number of plants used to source seed; and
- who collected the seed.

This information should be written out when seed or fruit is collected and subsequently recorded formally in a record book and on the seed container.

Seed production areas

Seed collectors tend to rely heavily on small patches of relatively healthy bush. These areas are often scarce and not able to supply the quantities, quality and continuity of seed supply needed. The creation of seed production areas aim to mitigate this problem.

Seed production areas have minimum requirements that ensure genetic integrity of the species. If you want to create a seed production area you need to do some homework on which species are suitable for your area and on your property and source some information on individual species requirements, seed sources, seedling growing and site layout from local experts. The critical component of a seed production area is the collection and propagation process. The actual in field growing is fairly straightforward with some yet to be explored management requirements.

Propagation

Growing your own plants is very rewarding. It means you have complete control over the whole process and you can be confident you are growing plants that you desire. However, there are a number of considerations before you take up propagating.

1. Time – although growing plants does not take up hours you do need to be around during the critical times (eg. the summer months to ensure plants are watered).
2. Space – not a lot of space is required but it is worth having a designated area.
3. Water – good quality water is critical and during the summer months plants can need two waterings a day.
4. Potting mix – a good quality potting mix can save a lot of time and money. It is worth the expense of purchasing a specialised mix rather than experimenting yourself.

This section is a back-yard guide to growing plants.

Propagation or nursery area

Your nursery is best situated where you:

- receive morning to full sun;
- have protection from hot north westerly winds;
- have easy access to a watering point;
- walk past regularly (regular prompt);
- can easily load or unload potting mix, plants or other heavy nursery equipment; and
- can protect plants from vandals such as possums and mice.

Essentials for a propagating area or nursery include:

- potting table at a correct height to avoid bending;
- tables/supports for holding plant containers that are at waist height and allow air movement underneath the plant containers (air movement allows air pruning of roots); and
- weed free area under and around growing plants and where plant containers are stored (mainly to reduce chances of snail and slug harbours).

You do not need a glasshouse or shade house to grow your own plants. They are handy but not essential. You only need a glasshouse if trying to propagate plants over the winter months (which is not always that successful). Having a shade house does reduce watering needs over the summer but it also means your plants grow in conditions of slight shade, therefore, you need to "harden off" plants before planting out.

Growing containers

The ideal growing containers should have the following characteristics, they:

- promote vigorous root development (ie. no root circling or "J" rooting);
- promote air pruning of roots;
- are light, compact and transportable; and
- avoid using large volumes of potting mix.

"Cell" containers are fast becoming the industry standard because of the above features.

Other common container systems include forestry tubes and old milk cartons, however, they have some disadvantages. They require boxes to support individual pots, are bulky and heavy to transport, require more space and potting mix, and do not allow for good root development (root bound).

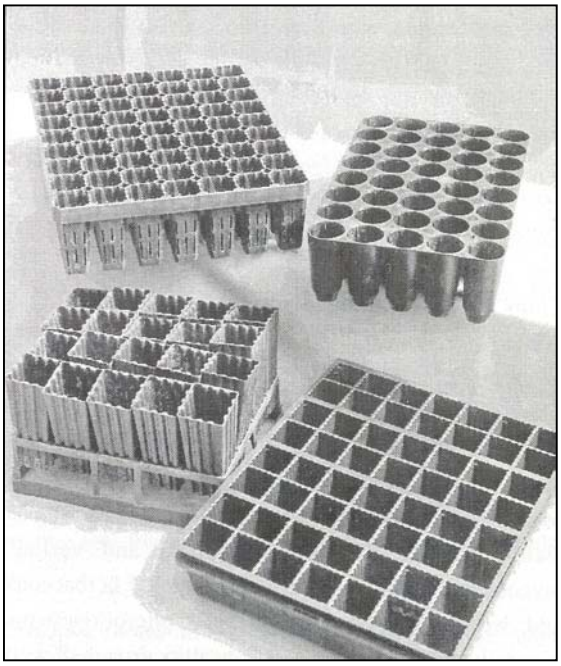

Figure 1: Various container systems.

It is worthwhile buying the recommended container systems. They can be reused for years and make growing your own plants much easier.

Potting mix

A good mix is the most important ingredient for successful plant growth. Avoid using soil in your potting mix as this will inevitably lead to poor plant growth, weeds and plant losses.

Making you own potting mix is an option using materials such as coconut fibre, sand and composted materials. This is time consuming and requires a bit more work to get the mix right (ie. the right amount of drainage versus moisture retention). Commercial potting mixes that meet the Australian Standards are the best option. The suppliers usually have mixes especially prepared for growing natives in containers.

The nutritional requirements of native plants in a nursery situation are very important. Plants do not need nutrients to germinate but need them to grow. Pre-mixing controlled release fertilisers (there are native blends available) into your potting mix is recommended, preferably matching release time to length of stay in the nursery. Plants relish regular feeding of fish fertiliser (of the feral variety).

Growing requirements

The essential requirements for germination and growing are a mix of viable seed, correct temperature, moisture, light and nutrition. Too much or too little of these will affect the plants germination and growth.

The optimum germination temperature is between the range of 10 to 25 degrees Celsius, with some species having more specialised requirements.

Seed preparation and treatment

Table 4 is a general guide to germinating most species for farm revegetation projects. Refer to individual plant descriptions in this Guide for more specialised notes on propagation.

Cuttings

If you can not get seed or readily propagate from seed, try cuttings. Cuttings should be taken when plants have strong fresh growth that has slightly hardened off. You do not always need heat beds to get roots going but they can speed the process up. The use of root hormone powder does help some species and not others – you will need to experiment. Honey can also be used as a root promoting substance and is worth trying. As a general guide, soft plants like some shrubs and perennials strike more readily than woody plants such as trees.

Table 4: A guide to germinating several native species.

Seed Type	Species Examples	Treatment
Hard coated seeds	Wattles, peas, hop bushes	Wattles – soak seed in very hot water. Peas – soak seed in warm water. Hop bushes – soak in warm water and sow when equal day/night hours.
Winged seed	Pines, bulloak	Both these species need stratification – place in fridge/freezer at 4 degrees for 2-4 weeks prior to germination.
Fine seed	Eucalypts	No treatment for species in region. Simply surface sow into containers.
Grasses	White-top, kangaroo grass	All grasses have dormancy mechanisms, over come by exposing seed to light. Sow seed on top of containers and do not cover.
Lilies	Chocolate lily, milkmaids	Use fresh seed and sow late autumn.
Saltbushes	Old man saltbush	Leach seed to remove salt in fruits - wash seed several times in fresh water. Seed can be placed into a cotton bag and washed in a washing machine!
Bursaria		This requires the use of fresh seed, stratified and sown in autumn.
Fleshy seed	Flax lily, rhagodia	Use fresh seed. Remove fleshy coating before sowing by soaking fruit in water to make soft then rubbing over heavy sieves, re-dry seed then sieve again.
Woody seed	Emubush, wilga, rosewood, native jasmine, myoporum	These seeds usually require a combination of moisture and warm temperatures to germinate (heat beds can help achieve this combination). Remove any fleshy coatings and use fresh seed.
Fluffy seed	Daisies	Requires exposure to light to break dormancy, therefore surface sow.
Feathery seed	Clematis	Use fresh seed slightly covered with potting mix.
Sticky seed	Pittosporum	Leach seed or clean with soapy water. Soak in warm water before sowing.

Watering

When seed is first sown, avoid excessive watering. Seeds need surprisingly little water to germinate. A seed's failure to germinate is often blamed on the seed, when, in fact, it may have rotted due to over watering. Water once a day and allow the potting mix to dry out a little to maximise seed germination.

Good quality water helps grow good quality plants. Bore water can hinder plant growth in a nursery situation due to higher salt and mineral levels. Plants are very intolerant to salt in the germination stage. If you have every other factor in your nursery right and your plants still are not doing well or look like they are burning off, test your water.

Other considerations

- Grow local native species suited to the revegetation site you have in mind.
- Avoid using overgrown plants that have small root systems and huge

lanky growth on top. If necessary prune back the tops of plants to match the root ball size.

Overall, enjoy growing plants. It does become completely addictive and a consummate passion. Have you ever noticed seed growers running out of conversation when together!

References and further reading

Ralph, M. (1997) *Growing Australian Native Plants from Seed.* Bushland Horticulture.

Bonney, N. (1994) *What Seed is That: a field guide to the identification, collection and germination of native seed in South Australia*. Finsbury Press Pty Ltd.

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