

Propagation by Seed and Other Means

TYPES OF SEED: Seeds differ dramatically from each other in many cases, some being light and feathery, others being heavy and bulky, some dust-like, some being enclosed in hard coverings called the endosperm (or food storage), some having no or very little visible outer coverings, some smooth as a babies bum and others spiky and sharp, and some being enclosed within fruits. Some seeds have a short shelf life (can be as short as a week) and others are long-lived (over 10 years for most acacia's and other hard-coated seeds.). Some plants produce masses of highly viable seed and others produce few viable seed amongst a mass of frass-like material. Some plants consistently produce seed that is insect damaged so always check for holes in seed.

EMBRYO: All seeds have one thing in common though - an embryo. Just as we would not expect a 10 year-old girl to bear children, we would not expect an immature embryo to produce healthy plants. Not saying that either wouldn't - just that chances are they both will produce better offspring if they're mature to start with so endeavour to collect mature and viable seed always.

MYCORRHIZA: In growing some seeds, we need the seed to be in contact with mycorrhizal fungi, which provides nutrients to the germinating seed. Without this, some species simply will not grow. Mycorrhizal fungi grows naturally in (most?) Aussie soils and can be observed sometimes as fine white-ish strands within the soil structure. This can be added to your seed growing mixes, by gathering soil from below the plant you picked the seed from. Sometimes you'll succeed and at other times, not. Mycorrhiza provides the growing seedling with nutrients it can't pick up for itself.

DORMANCY: Sometimes there are problems with dormancy to overcome. Many seeds will be viable but not grow reliably and this usually indicates that some sort of dormancy is at work. This is needed to ensure that conditions are just right when seed starts to grow, rather than having the seed sprout only to find that conditions change and the young seedlings all perish. So they need artificial treatment to copy what happens naturally to enable them to overcome their dormancy and grow. We have to stand in for Mother Sun, Father Rain, Brother Wind, and Sister Cold! ☺ Mostly, seed will have only one type of dormancy but some have several.

DORMANCY & TREATMENTS: Germination of seed varies from dead easy with no dormancy breaking needed (roughly about 30 - 40% of species in any given area,) to very difficult (approx. another 30%,) to impossible (roughly about 20 - 30%,) even by the experts!! There are various types of dormancy so the treatments will differ to overcome them –

1. Wet Heat Treatment - Hard-coated seed usually (but not always) responds to a hot water treatment, (by dropping the seed into a cup and pouring 4 times the quantity of water to seed, of recently-boiled water over them - not boiling...NOTE THE DISTINCTION - and leaving anywhere from several hours to overnight to 24 hours to soak.) It is hard to have hard and fast rules as some hard-coated seed is not as large, nor is the coat thickness the same, over different species. A variation of this treatment is to tip off the hot water immediately after pouring and cover with cold water and soak as usual as this has been found to be generally less damaging to the seed. Sometimes wet heat treatments can lead to rotting after sowing seed so other methods need to be used. Floating seed is always discarded as unviable. Species to use this treatment on include Acacia's (Wattles,) all the Pea Flowers (Kennedia, Pultenaea's, Bossiaea's, Dillwynnia's, Daviesia's and so on.)
2. Dry Heat Treatment - Microwave ovens can be used but are generally not as successful as wet heat. It does have the advantage of leaving seed dry and not as prone to fungal rotting and is quick.
3. Singeing – This can be done in a metal sieve, passing the sieve with seed several times over flames. Or plant the seed in a terracotta pot, place a few small leaves and twigs on top and set fire to them.
4. Scarification – Can be done in several ways, the easiest being to line a small lidded container with sandpaper, rough side facing toward the interior of container, popping

the seed in and sit rattling it while you watch TV until the seed coats are abraded enough to accept water when sown. It will also respond to the much more labour-intensive nicking with a file or knife, using nail clippers or needle to penetrate each individual seed coat, taking care not to nick the embryo, always at the end of the seed away from the aril (or scar.) This method is really only for large seed in very small lots or very valuable seed – or unless you have masses of time to waste! There is the possibility of using chemicals to abrade hard seed coats but as this is usually only used for large quantities of seed and, as it's difficult to explain, I will go no further.

OTHER TREATMENTS:

1. Immature Fruit - Whilst I said earlier that immature seed should not be used by preference, with some hard-coated seed that does not respond to normal treatment, perhaps the only way to grow these is to collect immature seed (changing from green to brown) and sow immediately so that the coat has no time to set hard. Some Acacia's (Wattles) and Hardenbergia's (Coral Vine) are in this category. Immature seed is harder to extract from its fruit or covering.
2. Natural Weathering – Some species may only respond to the natural treatment. That is sow it in summer in your seed trays (preferably using soil from under the plants you collected the seed from, as it has the natural micro-organisms intact in the soil) and leave out in the sun, without any artificial watering (just what comes from the sky.) Germination may occur after the first autumnal rains, but quite often it will take until the autumn after that. Persoonia (Geebung's) fit into this category.
3. Fermentation - Seed like Billardiera (Appleberry) and Dianella (Flax Lily) that comes within fleshy fruit may succeed better if fermented first. Add fruit to a plastic bag with a little water, seal it and place in the warm (not baking) sun for about 2 weeks before sowing.
4. Digestion – Seed from Exocarpus (Cherry Ballart) and Leucopogon (Beard-heath's) species germinates better if it is obtained from bird droppings. A messy and hard business to deal with unless you know where the birds that eat these fruits, roost. Other alternatives, but just as messy, is to feed it to chooks and sow their droppings! Or you could try eating the seed yourself....the rest I leave to your imagination, just don't tell me about it please!! 😊
5. Dry Storage – Some of our grasses have 'after-ripening periods' where they may need dry storage from about 3 to 24 months to break the dormancy. Or if you have access to a glasshouse, these grass seeds can be stored within so they experience naturally alternating day/night temperatures. Austrostipa's (Spear Grasses) and sometimes Themeda (Kangaroo Grass) come to mind here.
6. Washing, Soaking or Leaching – Some seed have chemical inhibitors within them to delay sprouting until weather conditions are right and will respond to washing or soaking, changing the water once or twice a day. Others like Correa's may need leaching and the easiest way to accomplish this is in your toilet cistern. Put seed into a stocking and hang within the water of the cistern where it will receive regular flushing, possibly for up to 10 weeks.
7. Stratification – is sometimes needed where seed comes from alpine or cold-temperate climates and consists of sowing seed into punnets, putting them in a plastic bag and placing in the bottom of the fridge for anywhere up to 2 months at 1 to 5 degrees C. Some Wahlenbergia's (Bluebells), Banksia's, Eucalyptus and Rubus (Native Raspberry) may benefit from this treatment.
8. Smoke Treatment – has been shown to increase the rate of success of germination in some species like Pimelea (Rice flower) and Stackhousia (Candles) and others. We can now purchase Smoked Water or Smoked Vermiculite to water our plants with or cover the top of the seed punnets with the vermiculite, much easier than when it was first known and people had to make their own smokers to put the punnets into.
9. Bog Treatment – I know this sounds like I have toilets and poo on the brain – really, I don't! Let's call it the wetland method then! Plants that grow in wetlands or other damp places respond well to being sown into punnets that are kept waterlogged. The way to do that is sow the seed in punnets but use compost or other highly organic material and add the punnets to a larger tray filled with water so that it comes up to 1cm below the seed. Lower the water level to 2 or 3cms below the seeds after two

weeks and leave it there until germination occurs. Remove the punnets once sprouting has occurred and water as normal.

SEED-RAISING & POTTING MIXES: My personal opinion is that seed-raising mix is not really necessary but can be used as a top layer over potting mix if you want to. In my previous life as an indigie plant grower, I never used it, using only potting mix to grow my seeds. If the mix had too many coarse parts, I used to sieve the worst of them out.

A good quality potting mix is essential and one with a fair bit of sand for its 'wettability' is good but not normally available in bags, usually only when you buy it in bulk. Bags of commercially available potting mix are fine but should be not too coarse so that water drains straight out of the media, not so fine that air space is limited between particles, so a good balance is required. There should always be nutrients placed in the media, either by the maker or you. Osmocote For Natives or Nutricote are optimum plant foods and should be well distributed. Potting mixes are not soil or dirt, they are organic materials like pine bark – the major part, then made up with different mixtures of maybe peanut shells, compost, sand, rice hulls, brown coal as lignite, sometimes even recycled plastic foams and acrylic chips. You can make your own but only if you were going to be using a lot would it be worthwhile. Check that your bag/s of potting mix meet the Australian Standard.

You will fill something in the order of 100 forestry plant tubes from a 25L bag of potting mix.

POTS: I prefer forestry tubes that have internal vertical ridges to train the roots straight down (rather than letting the roots encircle the pot) which is most important, nay essential, when growing trees, even shrubs, but not so important when growing clumping plants like Dianella's or Lomandra's (Mat-rushes) and grasses. I mean, a badly j-rooted tree might fall on your head one day when it is big, but what can a j-rooted grass do to you?? ☺ And then of course, the way to hold all those forestry tubes together with maximum efficiency is a rack – and preferably one that holds the tubes off the ground so that air can prune the roots as they grow out of the bottom. This way a perfect plant can be produced. Plastic or metal racks can be purchased but a table with steel mesh of a size to suit the pot can also be made fairly easily by a clever person.

CLEANLINESS (IS NEXT TO GODLINESS): Or so we are told. I have luckily never had a problem with diseases spread by dirty pots or equipment even though I never used to wash my pots. But prevention is better so sterilize pots, racks and trays before use by soaking for half an hour in household bleach at the rate of 1 part bleach to 18-20 parts water and air dry before use. Benches and equipment should be wiped over with bleach too.

SEED SOWING: is usually undertaken so that plants are ready at the optimum planting time. Most seed-grown plants will take between 4 to 12 months to grow to a good planting size. Seed normally should be sown when the weather starts warming, so in our climate here, Spring through to Summer so that the seedlings will be ready for an Autumn to Spring planting. However there are species that like to be sown in cooler weather like the Lily species, so they need to be sown in autumn and held over for the planting date. Of course not all plants grow at the same rate – some are fast out of the blocks and some are slow plodders. Experience will help you get to know these quirks.

There are two main ways of sowing seed – directly into each pot or into punnets or trays. Direct sowing means there is no problem with transplanting young seedlings and possible j-root problems, is easiest with larger seed like Acacia's, Allocasuarina (Sheoaks,) Banksia's, etc., and is a quicker process. It should be used for reliable germinators like Poa and Weeping Grasses or the pea flower family.

The second way, into punnets or trays means you have to 'prick out' or transfer each seedling to its own pot, but takes less room initially. It is good for those seeds that are not so reliable at germination (like Correa) or are very fine like Juncus (Rushes,) Eucalyptus, Leptospermum (Tea Trees,) and Melaleuca (Paperbarks.)

Seed is always covered to the depth that the seed is high, so a tiny dust like seed would barely need to be covered, as it will fall into the air spaces of the mix whilst a ½ cm thick seed needs to have ½ cm of mix put over the top of it. Seed should not be sown too thickly as airflow is vital for healthy seedlings and roots need the least disturbance possible.

Labelling is important – name of the species sown, date sown, and if you want to keep proper records then the collection place should be named as well as the date it was collected. Water seed in gently with either a soft rose or a misting bottle. Water should be kept up to the seed trays or pots to keep them constantly moist but do not over-water. The best way to water seed is to use a wicking bed or a saturated sand bed which both water from the bottom.

GERMINATION: Times vary here too – some bolt up quickly, others may take over a year but most start germinating within a few weeks.

PRICKING OUT (TRANSPLANTING): Is best done at the earliest possible stage, which is at the two-leaf stage of the seedling, if you can manage to hold the little dear! Never hold the plant by the stem as they bruise easily at this stage but instead, take it gently by one leaf. As you take it by the leaf, gently insert a dibbler stick (I re-use my take-away wooden chopsticks) and insert it from the side of the punnet to lift the seedling gently from underneath whilst gently easing it up by the leaf. It is then put into the already prepared tube, which has been filled to the top with mix, watered to settle the mix down and a hole made using your dibbler about 7cm deep and 2cm wide, into which you now carefully insert the roots of your seedling. Make sure you don't bend or twist the roots – if they are too long to fit into the hole, prune them (up to half the root can be removed without damaging the plant) with scissors or your thumbnail and forefinger.) Gently but firmly push the mix back around the plant making sure that it sits at the same level as it was in the punnet. Don't bury the stem deeper than it was. Make sure your label is updated with the date of pricking out and accompanies the plants. Now finally, re-water the plants with a fine mister to eliminate airspaces and place in a sheltered position until your plants harden up. An igloo or shade house is ideal if you have one. Tubestock dries out very quickly and is extremely hard to re-wet if you let them dry out too much.

OTHER WAYS OF GROWING PLANTS

CUTTINGS – are a good way to reproduce exactly the same plant off its parent if you want the same flower colour or some other desirable feature – it is a clone. Cuttings are therefore not the best way to propagate many plants of the same species. If one goes down with a disease, they're all likely to be affected. On the other hand, many cuttings will grow into a better specimen quicker than a seed-raised plant. Some cuttings grow like weeds and others take a very long time to become anything resembling a plant. Honey is a good substitute for hormone rooting powder.

DIVISION: Plants like most of the grasses and rushes, Dianella's and a few others, can be divided to increase your stocks of these types of plants. Dig them up or remove large ones from pots and carefully cut into pieces to be replanted into tubes again leaving enough root on each piece that it will grow again.

Seed Collection, Cleaning and Storage

As opposed to Jenny W. who needs to collect large quantities of seed and therefore takes whole branches at times, most seed, in the quantities that we, as private collectors and propagators, would require for personal use on our properties, can be readily collected in paper bags of various sizes without taking too much extra time or effort.

Collection: I only ever collected the seedpods or nuts themselves, never branches, when I was running a nursery, and these certainly fit well and easily into paper bags.

It is simply a matter of twisting nuts or fruit off the stems by hand mostly and does less damage to the plant. Secateurs can be used if desired, as Jenny said.

Drying: Paper bags are also a great drying facility, by leaving the seed capsules in the bag and putting them next to or on top of your water heater, on the dashboard or back parcel shelf

of your car, or any other warm place. Usually after a couple of days or a week, the capsules will split open and the seed is released. If you are in a big hurry to get your seed ready, a cabinet dryer or oven can be used, on a temperature of probably no more than 120 degrees Celsius, but watch that you don't leave too long and burn your bags! ☺

Cleaning: Fold the top of the bag securely and shake well to loosen any recalcitrant seed, pour into a kitchen sieve (over sheets of paper) to separate the bits of twigs, leaves and the nuts. You may need to buy a fine sieve as well and sieve it several times so that all most rubbish is gone and the seed remains.

Occasionally some seedpods do not open readily and other means have to be employed like crushing by hand or rolling pin, taking care not to damage the seed, but fortunately these species are few and far between.

Seed when stored should be totally dry. Any moisture left will induce fungal infection and mould and you'll waste this seed if left moist. Obviously, the seed should not have the life cooked out of it; we need the embryo to stay alive for the seed to grow, which is why it is better to take a little extra time to let it dry naturally. Usually several weeks in the bags will suffice if the bags are not crammed too close together.

Storage: Once cleaned and dried, the seed, if not all being used straight away, can be then placed in an airtight container and labelled.

Check that no insects are alive or visible in the seed before storing or you'll come back to find dead insects and little or no seed! ☺

Store in a dry, stable-temperature room like a bedroom. A laundry or kitchen are not good storage areas as their temperatures vary too much with heating, cooking, steam, etc.

RECOMMENDED READING:

Growing Australia Native Plants from Seed by Murray Ralph: published by Murray Ralph/Bushland Horticulture 1997. ISBN 0 646 315 37 4 .

And it's partner...Seed Collection of Australian Plants by Murray Ralph: published by Bushland Horticultural 1993. ISBN 0 646 12862 0

So...there you have it folks, that's propagation in a nutshell for you! Yeah, I know...pretty big nut! ☺

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