

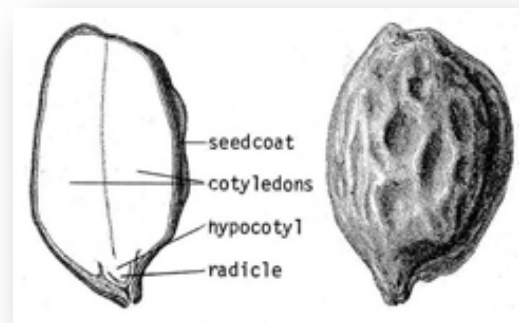
Gardening tips - Seed Sowing



Gardeners usually only sow seeds of garden varieties of flowers and vegetables. Most of these have been bred over the centuries to be quick and easy to germinate. It comes as a surprise to many people that, apart from these mainly annual plants, the seed of most species of plants in the wild does not germinate as freely and quickly as cress. In fact a large number of plants tend to use mechanisms to delay the germination of their seeds. There are many reasons for this but we will only look at those mechanisms for temperate plants. Although what comes next may seem complicated it is surprising how quickly you can pick it up, especially if you put yourself in the place of the seed and try to think what it needs in order to germinate.

The majority of plants ripen their seeds in late summer and early autumn when the weather is suitable for drying the seed. However, not many plants want their seed to germinate at that time of year since it would have to face the rigours of winter as a small vulnerable seedling. Therefore various strategies are employed to delay germination until the spring. These strategies include:-

1. A hard seed coat that slowly breaks down overwinter and does not allow water to penetrate until late winter or spring (a seed cannot germinate until it has imbibed water).
2. An immature embryo that does not ripen for some months after the seed has fallen. Sometimes a period of warmth is also required and this can mean that the seed will not germinate until at least 2 winters have passed.
3. Various chemicals that can inhibit germination. These are gradually leached out of the seed by winter rains.
4. A sensitivity to cold. Some seeds require a period of cold weather in order for certain chemical changes to take place in the seed. Only after this cold spell can the seed germinate.

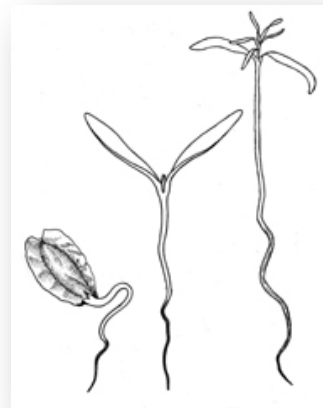


Seeds often employ more than one of these strategies which can complicate things no end. Some seeds have so many inhibitory mechanisms that they can take 4 years or more to germinate. It is possible for the gardener just to sow the seed and sit back and wait for nature to take its course but, although this involves the least work it also has the greatest risks. The longer a seed is kept in a seed-pot without germinating the more risk there is of the seed being lost either to insects, birds, mice, the

gardener forgetting to water it in the summer and the seed desiccating and a whole host of other possible accidents. Plants produce thousands of seeds but only one seed during the entire lifetime of the parent plant has to come through to maturity in order to maintain the population, therefore in nature a huge loss is expected. Gardeners only get a few seeds and cannot afford to waste them. Therefore they look for ways to speed up the germination process. These methods will now be looked at in some detail.

Germinating Seeds

Sowing 'green' seed If the seed of certain species is harvested before it has fully dried the seed coat will not have fully developed and certain chemical inhibitors may not as yet have been put in the seed. By sowing the seed immediately it is harvested, usually in a cold frame or outdoors, germination can be expected in the spring. This can save a year or more wait and entails very little extra effort so long as the seed comes from your own plants. The trick is in judging when to harvest the seed. The embryo must be fully developed or the seed will probably shrivel and die but if you leave it too long to harvest the seed will have developed the various inhibitors.



Scarification (or Scarify) A treatment for seeds with hard seed coats. Scarification is using one of several methods to reduce the seed coat before the seed is sown. These methods include:-

1. **Hot water treatment.** Water is brought to the boil and then allowed to cool very slightly. A small amount of water is then poured onto the seed. It is stressed that the amount of water must be small. The idea is that the hot water will soften the seed coat, leach out certain chemicals that may be present and that can act as germination inhibitors and encourage the seed to imbibe. It is not intended to cook the seed! As a rough rule of thumb you put a thin layer of seed into a container and then just cover the seed with water, perhaps the depth of water should be twice the depth of the seed layer. This should then cool fairly rapidly. More hot water can be added a few minutes later, perhaps the same as the quantity that was first added. The container is kept in a warm place for 12 - 24 hours and the seed is then sown. This method is used principally on legumes but is also suitable for many other types of seed. With legumes in particular, you should notice a distinct increase in the size of the seed after it has been treated, some seeds do not swell up though. Especially with legumes it can pay to repeat the practice if the seed has not swollen.
2. **Abrasion.** Here the seed coat is reduced by literally filing it away with sandpaper or a file or any other method you might care to imagine. Fine with large seeds but rather fiddly with small ones. You must be very careful not to file right through the seed coat and into the seed, you must be especially careful not to damage the embryo since this will kill the seed before it even germinates. Sometimes you simply file one small area of the seed coat until you are almost through to the seed, at other times the whole seed coat is abraded. This can be done by putting the seed into a drum that has a rough inner lining (perhaps a lining of sandpaper) and then revolving the drum for a while until the seed is abraded. It is very easy to overdo it if you are not careful. Alternatively, with some seeds it is sufficient to pierce the seed coat with a needle in order to admit water. Once again care must be taken not to damage the embryo.
3. **Acid treatment.** Not one for the faint hearted, nor for most amateurs. It involves soaking the seed in sulphuric acid until the seed coat has been reduced, then neutralizing the acid and sowing the seed. Timing is crucial, if the seed is in the acid for too long it will be killed. I do not use this method so cannot give full details.
4. **Fire.** Another that is definitely not for the faint hearted. You put the seed at the bottom of a frying pan or other similar metal container. Some straw or cut-up newspaper is put above the

seed and is then set alight. The trick is to provide enough heat to stimulate the seed into germination but not enough to kill it. This treatment is designed especially for seed of those species that live in areas with fairly regular forest fires. The seed does not germinate in the wild until after being stimulated by the heat of a fire.

Stratification This can be of two kinds, warm or, more usually cold. Stratification is a way of convincing the seed that it has passed a winter or a summer and winter and that it should now germinate. The first thing to do is either sow the seed in moist compost or put it in a plastic bag with about 5 times its bulk of moist leaf-mould (proportionally more leaf-mould if there is only a little seed and proportionally less if there is a lot of seed). Cold stratification involves keeping the seed in a cold place for a specified period. The salad compartment of a refrigerator or a shady north wall outdoors in winter can both work. A freezer is not recommended. The temperature for cold stratification is usually in the range of 2 to 5c, it should not normally be frozen. Warm stratification involves putting the seed in a warm place, perhaps an airing cupboard or a warm greenhouse for the time specified. It must be stressed that the seed has to be moistened before stratification and must not be allowed to dry out.

Soaking Very similar to one of the methods of scarification but this time the water does not have to be so hot. This method is used mainly for legumes and is intended to speed up the germination rate by days rather than months. The seed should swell considerably when soaking and should start to germinate immediately. Especially helpful when sowing peas or beans in the outdoor garden. Having learnt the various methods of inducing seed to germinate, how can you tell which method(s) to apply to the seed of any particular species? I'm afraid that there is no hard and fast rule. Considerable research has gone into the subject and there is a lot of literature available, though much of it is rather specialist and not easily available to the average grower. If the plant appears in our database then there is a very good chance that we will be able to tell you, but you can glean much for yourself if you know a little bit about the native habitat of the plant. One very simple rule of thumb for growing trees, shrubs and other perennials from areas with cold winters is that, if in doubt, sow the seed as soon as it is ripe and keep it in a cold frame or unheated greenhouse. Sometimes the seed will germinate quite quickly and you will have the problem of getting it through the winter without it going down to some fungal disease, but this is preferable to keeping a pot of seed for three years without germination ever taking place! If the plants you are trying to grow come from areas with milder winters (with only occasional frosts) then sowing the seed in a cold frame in late winter is usually more appropriate. If the plants come from areas that experience no, or virtually no, frosts, then sowing the seed in mid spring is usually more appropriate. If the seed of any species that you obtain has a hard seedcoat, then it cannot do any harm if you scarify it using the hot water method mentioned above. At worst it will make little difference to the time taken in germinating, at best it could save you waiting a year or two. If you want any more specific information on how to germinate a certain species then the list of suggested reading at the end of this article should be of help. Alternatively, you could always drop us a line (please enclose a stamped addressed envelope) and we will let you have whatever information we have on the plant.

Sowing the seeds

Now to look at some of the basic principles of seed sowing:-

Compost This does not normally need to be very rich, the seed of most species (orchids are a notable exception) contains enough food reserves to feed the growing plant for the first period of growth. However, if the seedlings are not going to be potted up when small they may need feeding with a liquid feed. A good basic compost mix is:-

- 5 parts good sterilized loam, preferably sieved to remove lumps
- 4 parts sharp sand
- 5 parts well rotted leaf-mould
- 3 parts well rotted compost

Add one extra part sand if a well-drained mix is required, add one extra part compost if a rich mix is required. If an acid mix is required it might be necessary to buy it in unless your soil is naturally acid. If a neutral compost is required and your soil is naturally acid then it will be necessary to add some lime or seaweed meal to the compost mix in order to increase the pH to around 6.5.

Sowing the seed The main thing here is to make sure that any pre-treatment has been carried out and that the seed is not sown too deeply (or too shallowly though this is normally less of a problem) and it

is put into the correct type of seed compost. You start off by loosely filling the seedpot with compost level with the top of the pot. You then firm down the soil (either by sharply tapping the base on a solid object or by gently pressing the compost down with the fingers). The level should drop by about 1 1/2 to 2 centimetres and this is a good level for most seeds. Very small or surface sown seeds will need a little more soil put into the pot before sowing the seed, larger seeds will need to be pressed into the soil a little. The seed is sown by spreading it thinly onto the surface of the compost and putting a thin layer of compost on top of the seed, equal perhaps to twice the thickness of the seed. There are a number of deviations from this basic method. The major deviations are as follows:-

- **Surface sowing** The seed is put onto the surface of the compost, perhaps a tiny amount of compost is spread on top and then the seed is gently firmed into place. Surface sown seed is much more susceptible to drying out so it is most important that pots of surface sown seeds are kept moist, but not waterlogged. Covering the pots with newspaper and glass is an effective way of holding the moisture in and reducing the need to water, but make sure this cover is removed as soon as the seed starts to germinate.
- **Gravel covering** If seeds are going to take more than a couple of months to germinate it is a good idea to cover the compost with small chips of gravel. This mulch helps keep the soil moist, reduces the risk of weed seeds finding their way into the pot and germinating, slows the rush of water into the soil when watering or from rain thus reducing the risk of seed being washed away and prevents soil compaction. After sowing the seed a very thin layer of compost is added and gently firmed down. The gravel is then added to the same depth that the compost would have been added if gravel was not used. In the case of large seeds proportionally more compost can be added and less gravel. A maximum depth of 1cm gravel is all that is needed.
- **Emmersion** Most commonly used for bog garden and water garden plants. After sowing the seed the pot is placed in a tray of water, the water perhaps reaching a quarter of the way up the pot. This keeps the soil very wet. In the case of water plants the level of water is usually increased as the seed germinates until it covers the pot and the growing plant.

Where to put the pot Different seeds have different requirements in order to germinate. Most need light but some require a shady position. Some need a lot of warmth, others only a little, whilst others need a cold period before they will even think about germinating. Seeds that need warmth and light should go into a greenhouse or polyhouse. A special place may need to be made for those seeds that require a period of cold. This place must be mouse and squirrel free and may also need protection from birds. It also needs to be exposed to the elements so a special frame covered in thin-mesh wire is often used and positioned against a north facing wall. An alternative, especially if a plant does not require as much cold as our winters normally provide, is a well-made cold frame.

Aftercare Watering is the main thing to be aware of once the seed is sown. The compost must not be allowed to dry out, but neither must it be waterlogged. The seed, especially as it starts to germinate, is very susceptible to drought or waterlogging and easily killed by either.

Getting the seed to germinate is only the start of course. Now you have got to look after the young seedlings so that they will eventually become mature plants. In the next newsletter we will take a look at this subject.

Further reading

Propagation of Trees, Shrubs and Conifers. by W. G. Sheat. Published MacMillan 1948

A bit dated but a very good book on propagation techniques with specific details for a wide range of plants.

Seed Manual for Ornamental Trees and Shrubs. by A. G. Gordon. and D. C. Rowe.

A very comprehensive guide to growing trees and shrubs from seed.

Hardy Woody Plants from Seed. by P. McMillan-Browse. Published Grower Books 1985.

It does not deal with many species but it is very comprehensive on those that it does cover and covers the basic principles very well.