



Best practice and aftercare of seed sowing starts this new series of features called RHS Masterclass.

Caring for seedlings

The first in a new practical gardening series shows that to raise plants from seed indoors successfully, the right conditions are needed at all stages of growth



Author: **Julie Hollobone**, Editorial Projects Manager for *The Garden*.
Photography: **Tim Sandall**

Sowing seeds at the start of the year silently confirms that a new growing season is about to start, and the results can be rewardingly quick. A pinch of seeds in the hand can hold such promise: they could be the start of a new flower border or vegetable garden, and there are many annuals that will grow into sizeable plants in a matter of weeks.

Right timing

It is tempting to start sowing early in the year to get a head start, but conditions are generally too cold and wet outdoors to sow direct into the soil until April in most regions. By starting seed off under cover in a

warm glasshouse or indoors, you can avoid losses due to poor germination or cold nights, and have a good supply of young plants ready to go outdoors as soon as the days warm up. The trick is to plan ahead and, ideally, sow at a time that will produce young plants ready for planting, just as the soil is warming and the danger of any further heavy frosts has passed.

Seeds sown in late winter will need to be put in a warm place to germinate; it can be as simple as a bright windowsill or a warm conservatory, but emerging seedlings also need plenty of light to develop well. If using an unheated glasshouse, delay sowing until mid-spring when temperatures are rising. ●

Stage 1: getting started

Before sowing seeds, consider how seedlings will grow to ensure they get the best conditions from the outset.

Choosing containers

Seeds can germinate in any container filled with the correct growing media if the conditions are right, but it is best to choose a suitable pot. Shallow pots and seedtrays suit seeds with small roots, whereas seedlings that quickly develop long roots (such as sweet peas) are better off in deep cells such as Roottrainers. Modular trays or cell tray inserts for seedtrays, divided into several sections, are good for larger seedlings to minimise the need for thinning before planting out.



Sow seeds that germinate with small leaves into shallow pots so they take up less space before they need to be separated.



Use modules for seeds that quickly grow into sizeable plants so that they are easily planted out with a plug of compost.

Growing media (composts) and materials



Seed composts Suitable growing media need to have a fine texture (sieve if necessary), be able to hold water and have sufficient air to promote growth.



Grit or perlite Add to soil-based compost up to 15 percent by volume to aid drainage and aeration, and for seeds needing good drainage (such as alpines and cacti).



Vermiculite Incorporate up to 15 percent by volume to coarse-textured, peat-free composts to improve aeration and reduce the chance of waterlogging after watering.

Filling containers

Before filling seedtrays and pots, ensure that the growing medium is moist, mixing in enough water so that the compost just sticks together if squeezed by hand. Slightly overfill containers, paying attention to the corners of seedtrays and individual cells in modules, then tap the container to settle the contents and remove the excess to give a level, even surface. Gently firm the surface with a tamper (a piece of wood) to give space for any covering required, typically a 10mm (3/8in) gap for medium-sized seed.



Fill trays or modules to the brim with moist compost, taking care that the corners of seedtrays and individual cells are evenly filled.



Use a ruler or piece of wood with a slight sawing action to remove the excess compost and leave a level surface. Firm gently with a tamper ready for sowing.

Stage 2: sowing for good germination

Taking care at all stages of sowing will ensure healthy seedlings that can develop into strong plants.

How deep?

Sow nearly all seeds, apart from the very finest, with a covering of compost so that they do not dry out during germination. Seed of a few species (such as *Oenothera biennis*) require light for germination but for most this is not a requirement. As a general rule, finer seeds will germinate into small seedlings and so should be sown on, or close to, the compost surface. Sow bigger seeds more deeply, because their larger shoots can reach the light before they exhaust food reserves. Consult seed packets for suggested depths prior to sowing.



Density of seed

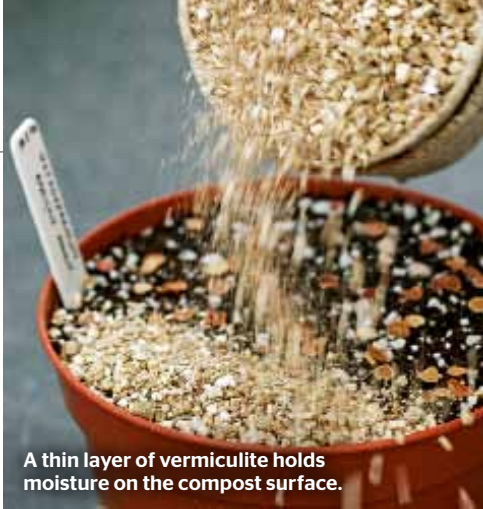
Try to sow seed evenly and sparingly to allow the leaves of seedlings space to develop once germinated. Closely packed seedlings are often more susceptible to 'damping off', a fungal disease that attacks the stems causing seedlings to collapse. Mix fine seed with dry sand before sowing to make it easier to see and therefore disperse evenly on the compost surface. Although some seeds may fail to germinate, consider the final number of plants required when sowing and do not be tempted to use a whole packet of seed if far fewer numbers are required. Sowing



Although the seeds of *Nicotiana* are fine, don't be tempted to sow too many into one seedtray as overcrowding occurs (above). into modules or cell tray inserts helps to control the number of seeds sown and avoids wastage due to the need to thin. Sow large seeds (such as courgettes or nasturtiums) straight into 11cm (4 5/16in) pots, two per pot, and remove the weaker seedling if both germinate.

Covering seed

Cover seeds with a layer of sieved compost or vermiculite to the required depth. Fine-grade vermiculite is useful for seeds that require light to germinate as it allows light to penetrate while holding moisture on the compost surface. Cover containers with a glass sheet, a plastic bag, clingfilm or a plastic tray cover to retain moisture and save on further watering before seeds germinate. Use an extra layer of fine grit on seeds that are slow (take several weeks or months) to germinate, or that you set outdoors or in a cold frame for a period of chilling, to protect against rainfall and prevent algae developing.



Conditions for germination



Place seed in a warm spot such as a windowsill above a radiator, a heated propagator or a heated pad on a glasshouse bench to speed germination. A temperature of 18-20°C (65-68°F) is ideal for tender plants including vegetables and will speed germination in hardy annuals and perennials (although they will also germinate successfully, if more slowly, at 15°C / 59°F). Specific plant seeds have special requirements, including temperature, to break dormancy (see below). Where containers are covered and the compost is moist, further water may not be required; but water uncovered containers in a glasshouse or windowsill daily with a fine spray, taking care not to saturate the compost and drive out the air.

What to sow through the year

JANUARY to FEBRUARY

- ❖ Slow-growing annual seasonal plants (such as petunias and begonias) at 20-25°C (68-77°F).
- ❖ Spring-flowering perennials such as *Aquilegia*, *Primula* and *Digitalis* at 15-20°C (59-68°F).

MARCH to APRIL

- ❖ Half-hardy annuals such as *Ipomoea*, *Tagetes*, *Pelargonium*, *Zinnia* and *Cobaea*.
- ❖ Perennials that flower in their first year (*Echinacea*, *Verbena*, *Rudbeckia* and *Salvia*).

MAY to JULY

- ❖ Hardy perennials to flower the following year (delphiniums).
- ❖ Tender vegetables such as sweet corn and courgettes.
- ❖ Winter or spring bedding such as wallflowers, *Bellis* and pansies.

SEPTEMBER to NOVEMBER

- ❖ Hardy annuals that overwinter as seedlings (sweet peas, cornflowers).
- ❖ Perennials, alpine and trees that require chilling (such as *Aconitum*, *Helleborus* and *Acer*).

The science of germination

Seeds can lie dormant for several years if conditions are unsuitable, but will spring into growth when they are right.

Each seed that forms in the parent flower contains an embryonic plant and some food reserves (typically as carbohydrates or oils). The metabolic activity of the embryo is virtually halted as seed is dispersed, but will restart if conditions of heat and moisture allow. As a seed is sown it first takes up moisture from the growing medium (compost) through the seed case – this will activate the embryo within to develop early shoot and root

growth. The fuel for growth comes from the food store within the seed, and uses oxygen from the air surrounding the seed to release the energy required. For this reason an ideal compost for seed needs to hold moisture, but drain well to maintain air spaces. The rate of growth increases with a rise in temperature, so seeds can be encouraged to germinate more quickly in warmer conditions. Many popular seed-raised annuals and

perennials such as *Helianthus* 3, *Sidalcea* 4 and courgettes 5 will germinate within weeks if held at 15-20°C (59-68°F) but seeds of more tender plants (such as *Ricinus communis* 2) are more successful at 22-25°C (72-77°F). Seed dormancy is a mechanism to delay germination until conditions of moisture and air are ideal and the embryo within is fully mature. Most commercially available seed will state on the packet if and what

treatment is required, but for collected seed remember to check for potential dormancy problems (see *The Garden*, Feb 2013, pp60-61). *Canna indica* 6 has a hard seed coat impervious to water and oxygen, but soaking the seed in cold water for up to six hours will enable it to hydrate fully. Seeds of *Verbena rigida* 1, a half-hardy perennial, require chilling for two weeks once sown into moist compost to stimulate germination.



Different seeds require specific conditions for successful germination.



Stage 3: seedling care

When seedlings emerge they need to be given space to grow on into healthy plants.



Pricking out Once seedlings develop a pair of fully expanded leaves, they need moving to a new pot filled with fresh, peat-free potting compost. Loosen the compost below the seedlings with a dibber.



Make a fresh hole with the dibber, lift a seedling by a leaf and lower it so that leaves sit at compost level. Prick out smaller seedlings into modules and larger seedlings into pots.



You can plant seedlings of some plants (such as tomato, above) more deeply than normal when pricking out. This is a useful technique to retrieve seedlings that may have become leggy in low light levels.

Growing on

As soon as they have leaves, seedlings need good light levels in order to grow well. A windowsill or glasshouse provides ample light in spring and summer, but may need shading from strong sunlight. Light levels fall significantly away from windows and into room interiors, below glasshouse benching or under dense shading material; as a result, seedlings can become pale and elongated as they search for light.

You can measure light levels with a meter (our own assessment is unreliable, as our eyes compensate in low light) - or just assume that light levels are too low away from a windowsill.

After germination, remove pot or tray covers to improve ventilation, and water to keep the compost moist. Most seedlings can tolerate slightly lower temperatures (typically a drop of 5°C / 9°F); they can become leggy if temperatures are too high, and should be moved to a cooler position.



Seedlings grow well in a bright and warm environment.



RHS / JACQUIE GRAY

Ready for planting

Continue to water seedlings regularly as they grow larger and become more sturdy.

As seedlings develop, move them to successively cooler positions such as from a cool windowsill to an enclosed porch, or from a warm glasshouse bench to nearer the open door. Pot up seedlings individually to grow on further and feed after a few weeks; you can often plant out fast-growing annuals still as plugs. Give plants several days to acclimatise to outdoor conditions before planting (especially in spring), either in an open cold frame or at the base of a warm wall (see *The Garden*, May 2012, pp61-63).

Find out more

Search 'Sowing seed indoors' at www.rhs.org.uk

❖ **Early plant propagation demonstration:**
RHS Garden Rosemoor,
25 March, 11am-12:30pm.

FURTHER READING

❖ *RHS Propagating Plants*, ed Alan Toogood, Dorling Kindersley, 2006, £18.99, ISBN 9781405315258.

❖ *RHS Propagation Techniques*, Mitchell Beazley, 2013, £12.99, ISBN 9781845337810.