



# Success with Very Small Seeds

*Dale O. Wilson, Jr., and Wm. Michael Colt*

Growing your own flower transplants gives you access to a range of species and cultivars generally unavailable in local bedding plant outlets. However, few endeavors try the patience of home gardeners more than germinating flowers with very small seeds.

Experienced gardeners usually have no problem with many other types of flowers or the common small-seeded vegetables such as carrots or onions. An ounce of carrot seed contains about 23,000 seeds. Some flower seeds are much smaller. Very small flower seeds are sold in glassine wrappers inside the regular seed package and look in many cases like a pinch of dust.

Very small seeds in this publication are arbitrarily defined as those with more than 50,000 seeds per ounce. Some species with somewhat larger seed are included if they are very popular or problematic.

## Dormancy

Most kinds of flower seeds exhibit some type of dormancy. Dormant seeds will not germinate unless triggered by specific environmental signals. The signals ensure that germination in the seeds' natural habitat takes place at the proper time and place. Success with flower seeds, especially very small seeds, often requires duplication of these cues plus careful attention to the germination environment.

Many seeds will not germinate when freshly harvested. This type of dormancy prevents many species from germinating in the fall under natural conditions. Usually, this kind of dormancy wears off in time. Seed companies typically store seed of this type before selling it. If you collect your own seed, you may encounter this problem.

Seeds of other species go dormant even though they are initially germinable. For this reason, and because seeds often die when kept a long time, don't bother trying to germinate seeds that are more than a few years old.

One of the most common types of dormancy is expressed as a cold requirement. Just as buds on many perennial plants require cold winter temperatures before they will grow in spring, many seeds will not germinate without a cold treatment. Often, cold temperature dormancy is broken by either cold or time. Treatments to overcome cold temperature dormancy include freezing the dry seed and stratification. Stratification is more reliable and consists of moistening the seeds in moist paper towels or in the germination medium and refrigerating them for periods ranging from a few days to a few months, depending on the species.

## Handling

Some seeds are so small that they cannot be sown easily by hand. The common tendency is to drop a quantity of seeds (maybe thousands) in one little pot. This can become expensive and greatly complicates transplanting.

Two sowing aides are useful. Either mix fine sand with the seed and sprinkle the mixture on the planting mix or use small scoops with manual or battery-powered vibrators.<sup>1</sup> Of course, if you are careful and have absolutely dry hands (a little talc is useful here), you can hold the seeds in your palm and sprinkle them with your fingers.

<sup>1</sup>Seed Master II or Vibra-seeder. A. H. Hummert Seed Company, 2746 Chouteau Avenue, St. Louis, MO 63103.

**Characteristics and germination conditions for many kinds of small seeds.**

Common name	Scientific name	Seeds per ounce (thousands)	Temperature (°F)	Germination conditions			
				Moisture <sup>1</sup>	Light	Time (days)	Comments
Ageratum	<i>A. houstonianum</i>	210	80	medium	yes	7	
Amaranthus	<i>Amaranthus</i> spp.	50	70	medium	yes	10	Cover lightly
Asiatic poppy	<i>Meconopsis</i>	?	55-65	moist	no	14-28	
Begonia	<i>Begonia</i> spp.	2,112	70	moist	yes	20	Sprinkle with coarse sand
Bellflower	<i>Campanula</i> spp.	120	70-80	medium	some species	6-12	Cover ¼ inch
Cape primrose	<i>Streptocarpus</i> spp.	?	55-65	moist	yes	14-30	
Cineraria	<i>Cineraria</i> spp.	100	70-80	medium	no	14	
Coleus	<i>Coleus blumei</i>	110	70	moist	yes	10	Injured by chilling
Foxglove	<i>Digitalis</i> spp.	180	65	moist	yes	7-21	
Impatiens	<i>Impatiens holstii</i>	34	70	moist	yes	18-30	Avoid chilling, cover lightly
Lobelia	<i>Lobelia erinus</i>	700	70	moist	yes	10-20	Perennial types stratify 3 months
Monkey flower	<i>Mimulus</i> spp.	700	75	moist	yes	7-21	Avoid chilling
Nemesia	<i>Nemesia</i> spp.	90	55-60	?	no	10	Injured above 65°F, requires darkness
Pansy	<i>Viola tricolor</i>	22	70	medium	no	7-12	Requires total darkness; 4 or 5 days stratification may help
Petunia	<i>Petunia</i> spp.	256	80	medium	yes	14	Will stand direct sunlight
Phacelia	<i>Phacelia</i> spp.	50	60	?	yes	5-12	Injured above 65°F
Portulaca	<i>Portulaca</i> spp.	280	70-80	dry	yes	4-7	May need prechilling
Primrose	<i>Primula</i> spp.	30	60	moist	yes <sup>2</sup>	20-30	May need 3 or 4 weeks stratification
Slipper flower	<i>Calceolaria</i> spp.	640	65-75	dry	yes	14-21	Avoid chilling
Snapdragon	<i>Antirrhinum</i> spp.	200	70	moist	yes	5-12	Freeze before sowing
Strawflower	<i>Helichrysum bracteatum</i>	45	60-75	medium	yes	10	
Tobacco	<i>Nicotiana glauca</i>	443	68-86	medium	yes	12	
Verbena	<i>Verbena</i> spp.	10	75	dry	no	8-18	Cover lightly, requires darkness
Vinca	<i>Vinca</i> spp.	20	80	dry	no	20	Cover ¼ inch, requires darkness

<sup>1</sup>Dry does not mean dry in the usual sense, but rather a little less moist with some shallow dry patches. Moist means continuously dark in color with abundant water but not a glistening film of water persisting on the surface. Medium is somewhere between moist and dry.

<sup>2</sup>Except *P. sinensis*, which requires total darkness.

## Containers and germination medium

Because it is difficult to duplicate the microbiological environment of the seed's natural habitat, use sterile potting mix or peat-based seed starting mix. Make sure all tools and containers are scrupulously clean. Many fungi that destroy seeds and seedlings become much more aggressive when introduced into a sterile environment. Wash your pots thoroughly and sterilize them with a solution of 1 part chlorine bleach in 9 parts water.

Plastic or clay trays and pots make good containers for starting small seeds. Especially useful are clear plastic sandwich boxes or utility boxes that come with clear plastic lids. Make some holes in their bottoms. Sowing very small seeds directly into peat pots or pellets is wasteful because the probability of germination is low and erratic.

Ordinary potting mix usually is an acceptable medium for starting small seeds if it doesn't contain large lumps or pieces of woody material. Some mixes are

milled more finely and are marketed as seed starting medium. These may be easier to use. Both types of medium will be referred to here as "potting mix."

Many potting mixes are somewhat water-repellent when completely dry so add some water before planting and mix it in thoroughly. Unless the potting mix is completely smooth and fine, sieve it before placing it in the container. After filling the container, tap it and scrape off excess mix with a ruler or pot stake.

The surface must be compacted and completely smooth. Make a press board that fits exactly into the planting container. Press the potting mix down using light to moderate pressure to make a smooth, uniform surface. The potting mix need not be deeper than 1½ to 2 inches.

Most very small seeds are best sown by broadcasting them thinly on the surface rather than planting them in rows. Unless otherwise noted in the accompanying table, do not cover the seeds with potting mix. Most small seeds require light, and the delicate shoots often

cannot penetrate soil. To ensure adequate seed-soil contact, press the seeds into the potting mix with the dry press board. Where noted, and for many somewhat larger seeds not included in the accompanying table, cover the seeds lightly with potting mix using a flour sifter or screen.

Seeds of species normally left uncovered may be covered partially with large vermiculite or coarse sand. Scatter the vermiculite or sand grains on the surface a little less than one particle deep, on average. The relatively large particles help maintain a favorable microenvironment around the seed but do not completely exclude light.

## Water

Do not water from the top because the seeds may wash away. Instead, place the pot in a pan of water just until the surface of the potting mix becomes moist. Remove the pot and allow it to drain. In early spring, tap water can be very cold. For those species requiring germination temperatures above 65°F and especially for chilling sensitive species, use lukewarm water.

Do not add fertilizer to the water until after germination. Terraclor fungicide can be applied at planting to help eliminate the risk of seedling diseases. Always follow label directions when using pesticides.

Unless you are extremely conscientious about watering, you will probably have best luck if you cover the trays with a transparent material. Leave a small space or gap to allow ventilation. One good approach is to put the trays in plastic bags. Open the bags slightly or punch holes to provide ventilation.

## Temperature

Maintaining the proper temperature is the most difficult part of germinating seeds at home. The temperature at a windowsill in early spring may fluctuate between 90°F in the day and 50°F at night. Very few kinds of seeds can survive this regime. Do not put the trays on the windowsill until after the seeds germinate.

Covering containers with plastic film or glass is useful for maintaining adequate moisture and nighttime temperature, but it makes the system susceptible to overheating in direct sunlight. Some heat-loving species may do well anyway.

Except for species needing the coolest temperatures, bottom heat is helpful. For those that require high temperatures and/or are chilling sensitive, a supplementary source of heat, especially at night, is essential in typical home environments during winter or early spring. Heaters made for this purpose are available at many garden stores. Starting perennials or biennials in

summer is easier because temperature is easier to control. Temperature control is less important after germination.

## Light

Most flower seeds need *diffuse* light for germination. Direct sunlight tends to overheat and dry the soil surface, even in covered containers. A northern exposure is ideal for germination. A southern exposure is fine if the trays are shaded, perhaps with several layers of cheesecloth, and the species is not damaged by moderately high temperatures. Artificial lights are reliable, especially fluorescent lights. After germination, most species need high-intensity light. Move the pot to a southern exposure and shade it with one or two layers of cheesecloth. For most species, remove the shade gradually. A few species require darkness to germinate.

## Transplanting

Very small seeds give rise to very small, delicate seedlings. One reason for planting thinly is to allow the seedlings room to grow until they are big enough to handle easily. Seedlings usually should be left in place at least until they have one true leaf. Then, they can be loosened with a table fork. Make holes in the potting mix with a pencil or similar tool. Holding the seedling by its leaves, place it into the hole and gently firm the mix around it to eliminate air spaces.

### Additional sources of information

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- Stokes Seed Catalog. Stokes Seeds Inc., Buffalo, NY.
- Toogood, A. 1987. Sowing tiny seeds. *Horticulture* (November):18-20.

**Trade names** — To simplify information, trade names have been used. No endorsement of named products is intended nor is criticism implied of similar products not mentioned.

**The authors** — Dale O. Wilson, Jr., is seed physiologist and Wm. Michael Colt is Extension horticulturist, both at the University of Idaho Southwest Idaho Research and Extension Center at Parma.

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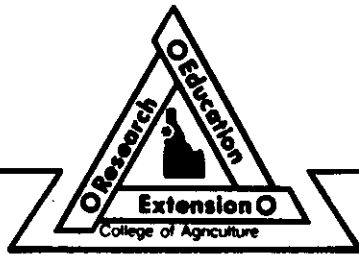
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