

Propagation

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Propagation methods:

- Seeds
- Stem cuttings, hardwood, softwood and herbaceous
- Leaf cuttings
- Layering
- Division (pups or offshoots)
- Root cuttings
- Grafting
- Cell culture

The name of the game is survival. Since plants have many different ways to ensure the continuation of the species, we can take advantage of this. Plants produce seed, and some even reseed themselves. Some plants do not produce seed (for example, Aussie basil) and must be propagated by other means. Some plants produce small pups that can be separated from the parent to form a new plant (for example, bromeliads and African violets). Stem and leaf cuttings can be used in many cases to form new roots, and eventually new plants. There is usually a best propagation method for each specific plant.

Starting with Seed

Producing your own plants from seed allows you to get the plant you want at the time you want it. If you wait for the local nursery to have it in stock, you might never get it. A nursery handles only those plants that have a proven history of popularity or plants that have had a lot of promotional advertising. Growing your own seedlings does require you to develop a plan and to realize that, in order to plant a tomato in March, the seed has to be planted in January or early February.

Seeds will germinate if the conditions are right. The conditions include light, temperature, and moisture. The seed contains everything else it needs to produce a plant. Some seeds require a pretreatment, such as cold treatment (stratification), scarification, or soaking to help break dormancy. Some seeds require light to germinate, such as petunias, impatiens, coleus and many others. Seeds of other plants, such as tomatoes, peppers and sunflowers, need darkness for germination.

Scarification is necessary with seeds that have tough coats, like moonflower, Texas mountain laurel and nasturtium. The seed is scratched by rubbing on sandpaper or by using a file, or it

can be nicked with a sharp knife. This allows moisture to reach the seed embryo area to start the germination process.

Stratification (cold treatment) mimics the cold season that a seed needs to go through to get ready to germinate. Phlox, clematis, primrose, and bleeding heart are a few of the plants that need cold treatment.

You need to know something about the plant before you attempt to grow it from seed. There are a number of books that will give you specific information about the plant you are interested in. The Internet is another source to use for information. Using the name of the plant as a key word will get you to a list of sources of information. Don't forget to read the package instructions if you have purchased seeds from a commercial source. Sometimes the details are pretty generic, but at other times quite specific.

How long can or should you store seeds if you collect them or have some left over after planting for the current year? For vegetables, refer to the table below:

| Seed Viability, Length of Time | | |
|---------------------------------------|------------------|-------------------------------|
| Short-lived, replace each year | 2-3 years | Long-lived (4-5 years) |
| celery | beans | beets |
| leeks | broccoli | cabbage |
| lettuces | Brussel sprouts | collards |
| onions | carrots | cucumbers |
| parsley | Chinese cabbage | eggplant |
| parsnips | kohlrabi | endive |
| spinach | okra | kale |
| sweet corn | peas | muskmelons |
| | peppers | mustard |
| | southern peas | pumpkins |
| | | radishes |
| | | rutabagas |
| | | squashes |
| | | Swiss chard |
| | | tomatoes |
| | | turnips |
| | | watermelons |

Source: *Vegetable Gardening*, William D. Adams and Thomas LeRoy, 1995, Taylor Publishing Company, p. 57

It is more difficult to predict the lifetime of seeds for annuals and perennials. A seed may not germinate for a variety of reasons. The seeds may not have been fertilized, may have defective genes, or may have been damaged by insect or fungal attack. Fleshy seeds die very quickly, so these need to be planted as soon as they ripen. Citrus is a good example of seeds that should be planted very soon after harvesting from the fruit. Dry seeds such as beans and sunflowers can

be kept up to ten years. The viability of medium-sized or large seeds can be checked by adding them to a jar of water. The viable seeds will sink, while the dried out or hollow seeds will float. The viable seeds should be dried off and planted immediately. To preserve seeds as long as possible, they should be stored dry in tight containers in a refrigerator at about 40°F. Paper bags inside of plastic bags or plastic boxes work well. To check on germination rates, place a line of 10 seeds on a moist paper towel. Fold it over on the line of seeds, roll it up and place it in a plastic bag and put it in a warm location. Keep track of the date and check for germination every day starting at about the third day. Note down the number of seeds that produce roots, multiply by 10 and you have a germination percentage to help you decide how many seeds you need to plant. Since these have germinated, they can be planted if handled carefully. Sometimes the root works itself into the weave of the paper and will break if you try to separate it. If that happens, cut the paper along with the root and plant it all.

What about collecting your own seeds from this year's plants to use for next year? This is possible, but you might be very surprised at the plant that is produced. Seeds gathered from hybrid plants will rarely produce a plant that looks exactly like the parent. This is the way new plants are formed, by the cross-pollination that occurs in the garden naturally or in the test garden by plan. For example, if you have five different tomato plants in your garden and you save the seeds from one of them, the probability of the seeds producing the same tomato that the seeds came from is very low since pollen from the other four plants have probably fertilized the blossoms of that plant. If you wish to save seeds the plant needs to be isolated from others of its species.

Planting the seeds

Materials:

- Pots or any container that will hold planting medium and has holes in the bottom
- Clorox (10% solution)
- Planting medium — sterile commercial potting soil or a mixture of potting soil and perlite. No fertilizer is needed since the seed contains all it needs to produce the plant.
- Water
- Plastic bags
- Labels
- Source of light
- Heating pad — optional

Potting soil is often hard to moisten thoroughly, since it usually contains peat, which doesn't absorb water readily. You need to moisten, wait, and moisten again. Fill the container you plan to use for planting the seeds with the moist mixture. The container should be as clean as possible. If you are reusing old pots, they should be cleaned thoroughly and then rinsed with 10% Clorox solution.

Small seeds can simply be placed on top of the medium. Larger seeds should be placed in a depression so the seed is at least the same depth as the size of the seed. The next step is to determine whether or not the seed requires light for germination. This information is usually available on the seed packet. If you don't have a seed packet, you can refer to one of the many books that provide that kind of information. If light is required, the seeds should not

be covered. If light is not required, the seeds should be covered with the planting mix or with vermiculite. The vermiculite not only provides a dark environment but it also holds water at the surface so the seeds stay moist during the germination process. The container should be covered with a clear material such as plastic or glass. If you use one of the very handy clear plastic take-home containers, you can simply close the lid. Don't forget to punch some holes in the bottom before filling with planting medium.

Bottom heat encourages germination, so a heating pad designed to be used for plants can be used, or you can place the containers with seeds in some warmer spot in your house, such as the top of the refrigerator. If light is also required, the best place would be near a window, under a grow-light, or just near a fluorescent fixture of some kind. Label each container with the name of the plant and the date. Keep a record of the time to germination for future reference. The first thing that will happen is the absorption of water by the seed. Then the radicle emerges to form the first root. After that the stem and leaves form and break through the surface. Be patient.

When the plant breaks the surface, the cover should be removed and the container moved to a stronger light source. A sunny window is good, but the plants will probably be leggy simply because 12–14 hours of sunlight is hard to come by in a consistent manner.

The first leaves you see are not true leaves, but are the cotyledons, which provide the nutrition for the new plant. The plants can be “bumped up” to a larger pot when there are at least two true leaves. Fill the new container with moist potting soil, make a depression in the center with a pencil. Carefully remove the seedling from the germination container. This can be done with any narrow tool such as a spoon handle or a thin spatula. Handle the seedling by one of the leaves, never by the stem. Place it in the hole and gently firm the potting soil around the plant. Most plants should be placed a little deeper in the new pot than they were in the germinating mix. Some, like tomatoes, should be placed as deep as possible in the new pot, up to the first true leaves. They will produce new roots all along the buried stem, giving you a much stronger and less leggy plant.

Careful daily attention is required at this point. Fertilize weekly with a dilute solution of some complete fertilizer. Fish emulsion at half strength works well. You can also work Micro-life or cottonseed meal into the planting mix before transplanting to the larger containers. Temperatures for growing-on are also important. Seedlings do better if nighttime temperatures are lower than daytime. For example, tomatoes like 85°F for germination, but grow best if daytime temperatures are 70–80°F and nighttime temperatures are 60–65°F. Also make sure the seedlings have room to grow and 12–14 hours of sunlight or exposure to a grow light. Crowded seedlings searching for light will grow weak and lanky. If you use a grow light, the light should be only 1–2 inches above the foliage.

The usual time from planting the seed to transplanting in the garden ranges widely so you may need to consult a reference source to determine when the seeds should be planted. Typical times are 6 to 12 weeks. See table on the next page for some examples.

One cannot take a plant from its cozy, well-attended pot in the greenhouse or on a protected porch directly to the outdoors. A time for “hardening off” is required. This is a method of conditioning the plant to the changing environment. Put the plants outside in a sheltered location for a few hours the first day, and then increase the hours of exposure each day until you finally leave them outside all the time. They will then be ready to put into their final bed or pot.

Also keep in mind that some plants are better started from seed directly in the garden soil where they will grow. Lettuce, for example, will grow successfully if broadcast directly in the bed. Cucumbers do not like to be transplanted so should also be planted in hills directly in the garden. An advantage of starting them indoors would be to rush the season a bit, but it isn't worth it if you lose the plants during the transplant. Other vegetable seeds that do well with direct seeding are collards, kale, mustards and many herbs. Beans and peas are almost always seeded directly where they are to grow. Decorative annuals, nasturtiums, asters, petunias and violas also do well if seeded in the garden.

| Planting Information for Vegetables | | | |
|---|---------------------------------------|------------------------------------|------------------------------------|
| Vegetable | Time to transplant size, weeks | Seed planting depth, inches | Temperature for germination |
| cabbage, broccoli, cauliflower | 5 to 7 | 1/4 to 1/2 | 85°F |
| lettuce | 4 to 6 | 1/4 to 1/2 | 75°F |
| onions | 8 to 10 | 1/2 | 75°F |
| tomatoes | 5 to 6 | 1/4 to 1/2 | 85°F |
| peppers | 7 to 8 | 1/4 to 1/2 | 85°F |
| eggplant | 7 to 8 | 1/4 to 1/2 | 85°F |
| cucumber, squash, muskmelon, watermelon, etc. | 2 to 3 | 3/4 to 1 | 85°F |



Gardening fact sheets are distributed by Harris County Master Gardeners, community volunteers trained in basic horticulture by the Texas AgriLife Extension Service. For information about Master Gardener volunteer training classes, call Extension's Harris County office at 281.855.5600, or send an e-mail to harris@ag.tamu.edu.